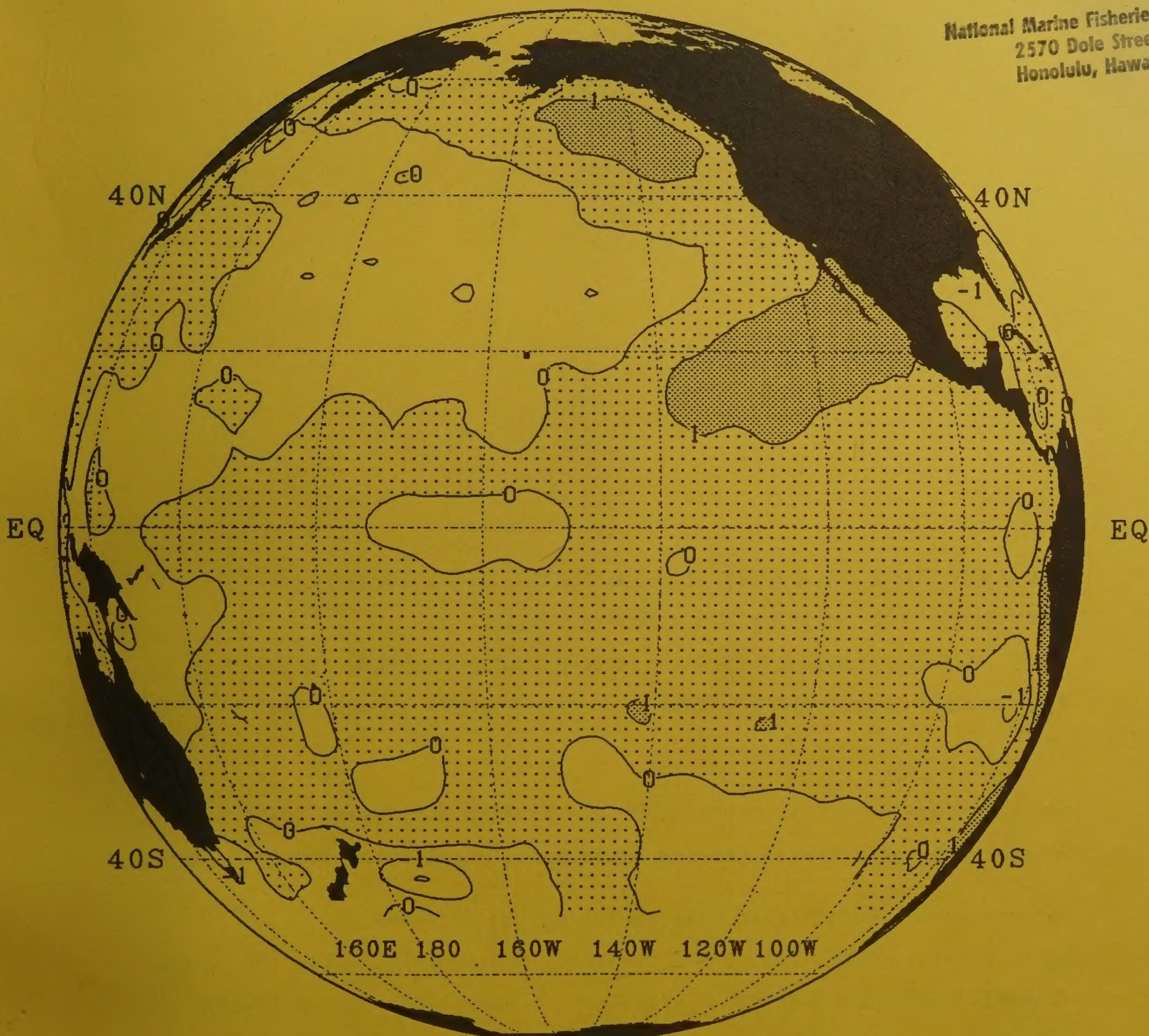
気象庁海洋月報

Monthly Ocean Report

January 1994 (No.13)



El Niño Monitoring Center
Japan Meteorological Agency

気象庁海洋気象部海洋課
エルニーニョ監視センター

平成6年1月

気象庁海洋月報は、気象庁海洋気象部海洋課エルニーニョ監視センターで
作成されています。本月報に関する問い合わせは、
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Monthly Ocean Report is prepared by the El Niño Monitoring Center(ENMC),
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表紙は1994年1月の太平洋の月平均海面水温偏差図です。
陰影部は平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for January 1994 in the Pacific Ocean. Areas of positive anomalies are shaded.

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海況の特徴（1994年1月）

太平洋の海況

太平洋赤道域の海面水温は、170～150°Wと90°W付近を除いて平年より高かったが、平年より0.5℃以上高い海域は日付変更線付近、110°W付近及び南米沿岸に限られた。エルニーニョ監視海域（4°S～4°N,150°W～90°W）の海面水温偏差は、+0.3℃だった（第1表、第1図、第6図）。

気象庁の海洋気象観測船「凌風丸」は本年1月、日本近海から赤道域に至る東経137°Eに沿う海洋観測を行った。太平洋西部熱帯域の表層水温は1990年1月以降、平年並か平年より低い状態が続いており、今回の結果でも12°N以南の表層水温は平年より低く、特に5°Nの125～150mでは平年より6℃以上も低かった。また、水温躍層の目安となる20℃の等温線も7°Nで70m(平年100m)、5°Nで90m(平年150m)となっており暖水層は薄かった（図A）。

北太平洋の海面水温は、30°Nに沿って170°Eから130°Wにかけて平年より低い海域が広がっていた。カリフォルニア半島沖及びアラスカ湾沖では1℃以上平年より高い状態が続いていた（第1図）。

日本近海の海況

日本近海の海面水温は、日本海西部、北海道から関東にかけての太平洋沿岸を除き、平年より0.5℃以上高かった(第17図)。

黒潮は、1月中旬までは日本の南岸に沿ってほぼ直進し房総半島沖を東に流れていたが、下旬には紀伊半島からほぼ東に流れ、140°Eから北上する流路に変化した（第20図）。

本州東方の親潮系の冷水(深さ100mで5℃以下)の沿岸寄りの分枝は39.8°N・142.7°Eまで、沖合の分枝は38.6°N・146.2°Eまで、それぞれ達していた（第19図）。

熱帯の気象

南太平洋収束帯(SPCZ)は平年よりやや南偏して活動が活発であった。対流活動は西部熱帯太平洋でやや不活発、赤道域の日付変更線付近では平年並であった。下層東西風は太平洋熱帯域の中部及び西部で東風偏差が強まった。海面気圧はオーストラリア西部を除いた太平洋熱帯域のほぼ全域で負偏差となった。このためSOIは弱いながら負の値(－0.2)となった(第1表、第12図、第13図)。

[気象庁長期予報課提供]

HIGHLIGHTS January 1994

Pacific

Sea surface temperatures (SSTs) in the equatorial Pacific were higher than normal except 170°W - 150°W and around 90°W. SSTs more than 0.5°C above normal were found only around the date line, around 110°W and off the west coast of South America along the equator. The SST index for region B (refer to Fig.6) was +0.3°C (Table 1 and Figs.1, 6).

According to the oceanographic observations in January by R/V Ryofu Maru of the JMA from 3°N to 34°N along the meridian of 137°E (refer to Fig A), the depth of the 20°C isotherm was 70m (normal 100m) at 7°N and 90m (normal 150m) at 5°N. Subsurface temperatures south of 12°N were lower than normal, and negative temperature anomalies at 5°N, 125m - 150m exceeded -6°C. Lower or near normal condition of subsurface temperature has continued since January 1990 in the western tropical Pacific.

In the North Pacific Ocean, negative SST anomalies have remained from 170°E to 130°W along 30°N. SSTs off Baja California and off the Gulf of Alaska were 1°C above normal (Fig.1).

Seas adjacent to Japan

SSTs in the seas adjacent to Japan were more than 0.5°C above normal except in the western part of the Japan Sea and from off Hokkaido to off Kanto (Fig.17).

The Kuroshio flowed straight along the south coast of Japan, then it flowed eastward off the Boso Peninsula until the middle of January. At the end of January, it flowed eastward off the Kii peninsula and then northward from 33°N, 140°E (Fig.20).

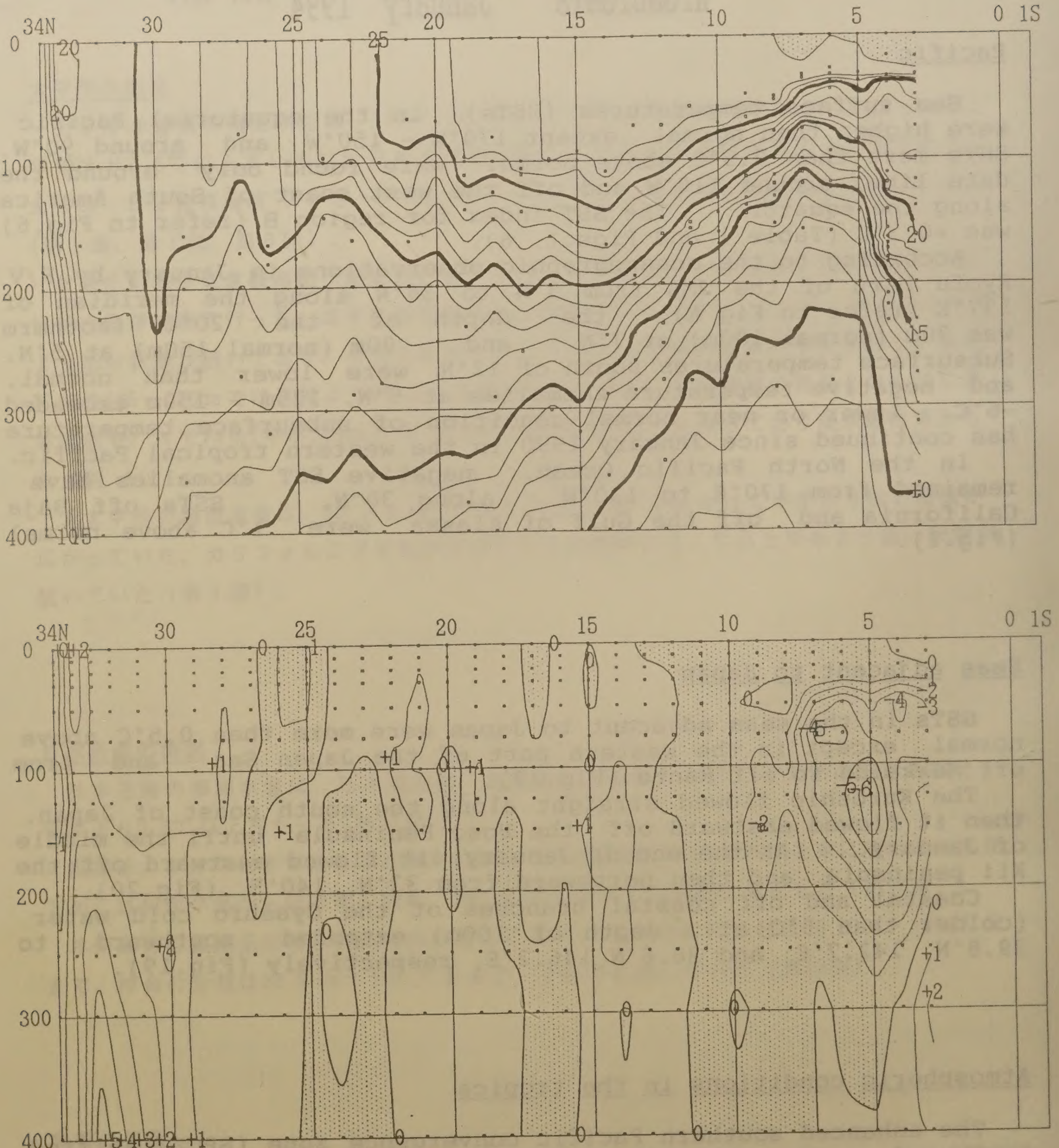
Coastal and off coastal branches of the Oyashio cold water (colder than 5°C at a depth of 100m) extended southward to 39.8°N, 142.7°E and 38.6°N 146.2°E, respectively (Fig.19).

Atmospheric conditions in the tropics

The enhanced southern Pacific convergence zone (SPCZ) shifted southward. Convective activities were slightly weaker than normal over the western tropical Pacific, and almost normal near the date line along the equator. Low level equatorial easterlies remained stronger than normal over the central and western Pacific. Except western Australia, negative sea level pressure anomalies have persisted throughout the tropical Pacific. Then, SOI returned slightly negative (-0.2) (Table 1 and Figs.12, 13).

[prepared by the Long-range Forecast Division, JMA]

Depth-Latitude Section of Temperature along 137°E



図A　1994年1月の137°Eに沿う表層水温断面図(上)と偏差図(下)

Fig.A Depth-latitude section along 137°E of ocean temperature(top) and anomalies (bottom) for January 1994. The contour interval is 1℃. Anomalies are computed with respect to the 19 years mean (1972-90). Waters warmer than 28℃ and areas of negative anomalies are stippled.

Date		1992				1993													1994
		AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
Pacific Sea Surface Temperature (℃)																			
D	(14N~ Eq.)	29.1	29.2	29.5	29.0	28.7	28.0	28.0	28.2	28.6	28.8	29.2	29.1	28.9	29.1	29.1	29.5	29.1	28.4
	(130E~150E)	0.0	0.0	+0.2	-0.2	-0.2	-0.5	-0.3	-0.2	-0.2	-0.3	-0.1	-0.1	-0.2	-0.1	-0.2	+0.3	+0.2	-0.1
A	(4N~ 4S)	29.1	28.8	28.8	28.7	28.8	28.5	28.4	28.4	28.7	29.0	29.1	29.1	28.8	29.1	28.8	28.9	28.7	28.2
	(160E~150W)	+0.7	+0.5	+0.4	+0.3	+0.6	+0.5	+0.4	+0.3	+0.5	+0.5	+0.6	+0.6	+0.4	+0.8	+0.4	+0.5	+0.5	+0.2
B	(4N~ 4S)	24.6	24.5	24.6	24.7	25.0	25.5	26.6	27.4	28.1	28.0	27.0	25.8	24.9	24.8	25.0	25.2	25.3	25.7
	(150W~ 90W)	0.0	-0.1	0.0	+0.1	+0.1	+0.1	+0.4	+0.5	+1.0	+1.4	+0.9	+0.6	+0.3	+0.2	+0.4	+0.6	+0.4	+0.3
C	(Eq.~ 10S)	20.5	20.2	20.8	21.2	22.5	24.3	26.1	27.0	26.4	25.2	23.3	22.1	21.0	20.8	21.3	21.5	22.8	24.7
	(90W~ 80W)	-0.1	-0.1	+0.1	-0.3	-0.1	0.0	+0.4	+1.1	+1.3	+1.3	+0.6	+0.5	+0.4	+0.5	+0.6	0.0	+0.2	+0.4
Pacific Sea Level Anomaly (cm)																			
YAP	(10N,138E)	-3	2	9	6	8	7	9	11	1	-2	-2	1	-1	5	8	8	10	
RABAUL	(4S,152E)	-11	-10	-6	-6	-6	-9	-10	-14	-12	-13	-11	-8	-9	-7	-6	-5	-2	
MAJURO	(7N,171E)	7	11	15	6	4	-1	-4	-4	-8	-1	6	5	3	1	5	2	3	
TARAWA	(1N,173E)	3	5	2	2	4	1	7	10	3	5	6	4	7	4	6	2	1	
CHRISTMAS	(2N,157W)	-7	-4	-3	4	1	5	4	8	6	5	-1	-2	-1	-1	-2	-1	-7	
SANTA CRUZ	(1S, 90W)	-1	-3	-1	-1	-2	4	8	7	7	10	4	0	0	1	3	0	0	

第1表 (a) エルニーニョ監視指数

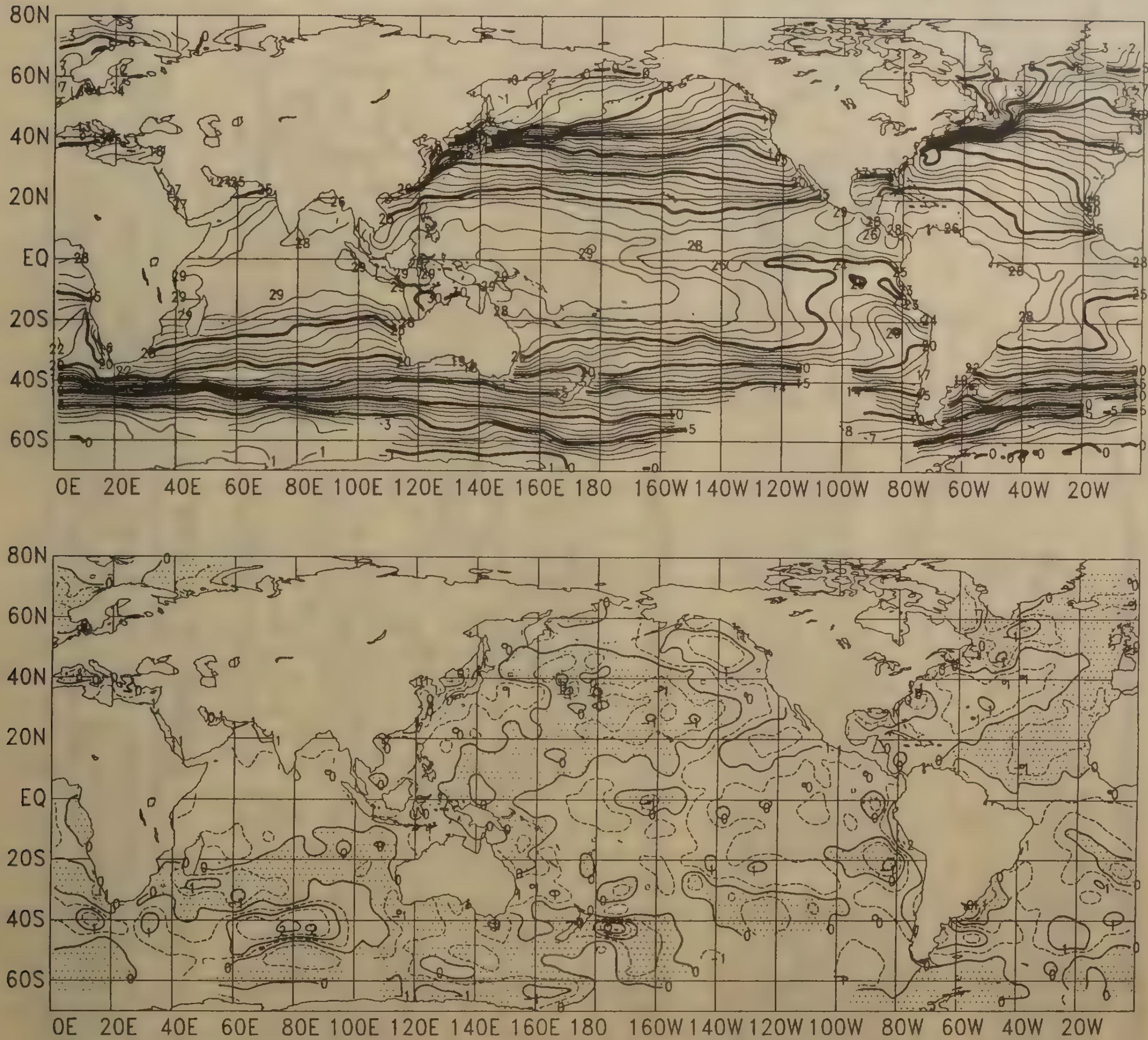
Table 1(a) El Niño monitoring indices. Data sources are the El Niño Monitoring Center, JMA for the sea surface temperature and the SOC of ISLP-PAC, Dept. of Oceanography, University of Hawaii for the sea level anomaly.

Date	1992				1993												1994
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
Southern Oscillation Index (Unit of pressure anomalies at Tahiti and Darwin : hPa)																		
SOI (TAHITI-DARWIN)	0.1	-0.0	-2.0	-0.6	-0.5	-0.8	-0.6	-0.5	-1.9	-0.8	-1.6	-1.0	-1.5	-0.7	-1.4	-0.0	0.2	-0.2
TAHITI (17.5S , 150W)	0.1	-0.8	-2.3	-0.5	-1.1	-1.4	-1.9	1.0	-0.7	0.2	-0.6	-1.1	0.0	-0.0	-0.9	0.1	-0.0	-0.1
DARWIN (12.5S , 131E)	-0.1	-0.8	0.5	0.6	-0.2	0.4	-0.3	2.4	1.9	1.4	1.3	0.4	2.2	1.4	1.3	0.1	-0.5	0.3
High Cloud Amount Index																		
HCLD-PH (20N ~ 10N) (110E ~ 140E)	0.2	-1.6	0.9	-1.7	-1.4	-1.0	-0.3	-0.4	-0.5	-2.2	-1.9	-0.5	-0.4	0.7	-0.1	-0.6	1.2	-0.5
HCLD-MC (5N ~ 5S) (110E ~ 135E)	-1.2	-0.4	0.6	-0.8	0.4	-1.1	-0.9	-1.1	0.3	-1.4	-2.1	-1.0	-1.4	-1.0	-1.5	-0.8	-0.2	-0.4
HCLD-DL (5N ~ 5S) (170E ~ 170W)	0.1	-0.6	-0.1	1.3	1.2	0.8	1.4	0.5	2.8	2.0	1.8	1.3	0.3	1.8	1.7	-0.2	0.0	0.0
Equatorial Zonal Wind Index																		
U200-IN (5N ~ 5S) (80E ~ 100E)	-0.4	-1.1	-1.4	0.1	0.1	-0.1	0.8	-0.9	-0.3	0.5	0.4	-0.3	-0.5	-2.1	-0.7	-0.8	-1.8	-0.4
U200-CP (5N ~ 5S) (180 ~ 125W)	1.1	-0.4	0.7	-0.2	0.7	-0.3	-0.3	0.0	-0.6	-1.3	-0.0	1.1	0.3	-0.3	0.0	-0.5	0.4	0.4
U850-WP (5N ~ 5S) (160E ~ 175W)	-0.4	0.2	0.2	0.4	0.8	0.3	0.9	0.3	0.8	0.5	0.3	0.1	0.7	-0.0	0.9	-0.4	-0.7	-1.2
U850-CP (5N ~ 5S) (170W ~ 135W)	-0.7	0.5	-0.4	0.9	0.2	0.2	0.0	-0.1	0.3	0.6	0.6	-0.8	0.1	0.2	0.4	0.3	-0.5	-0.6
U850-EP (5N ~ 5S) (130W ~ 100W)	-0.9	0.6	-1.2	1.9	-0.0	0.1	-0.1	0.2	0.5	0.9	0.7	-0.4	0.8	1.0	0.2	0.9	0.2	0.1

第1表 (b) エルニーニョ監視指数(続き)

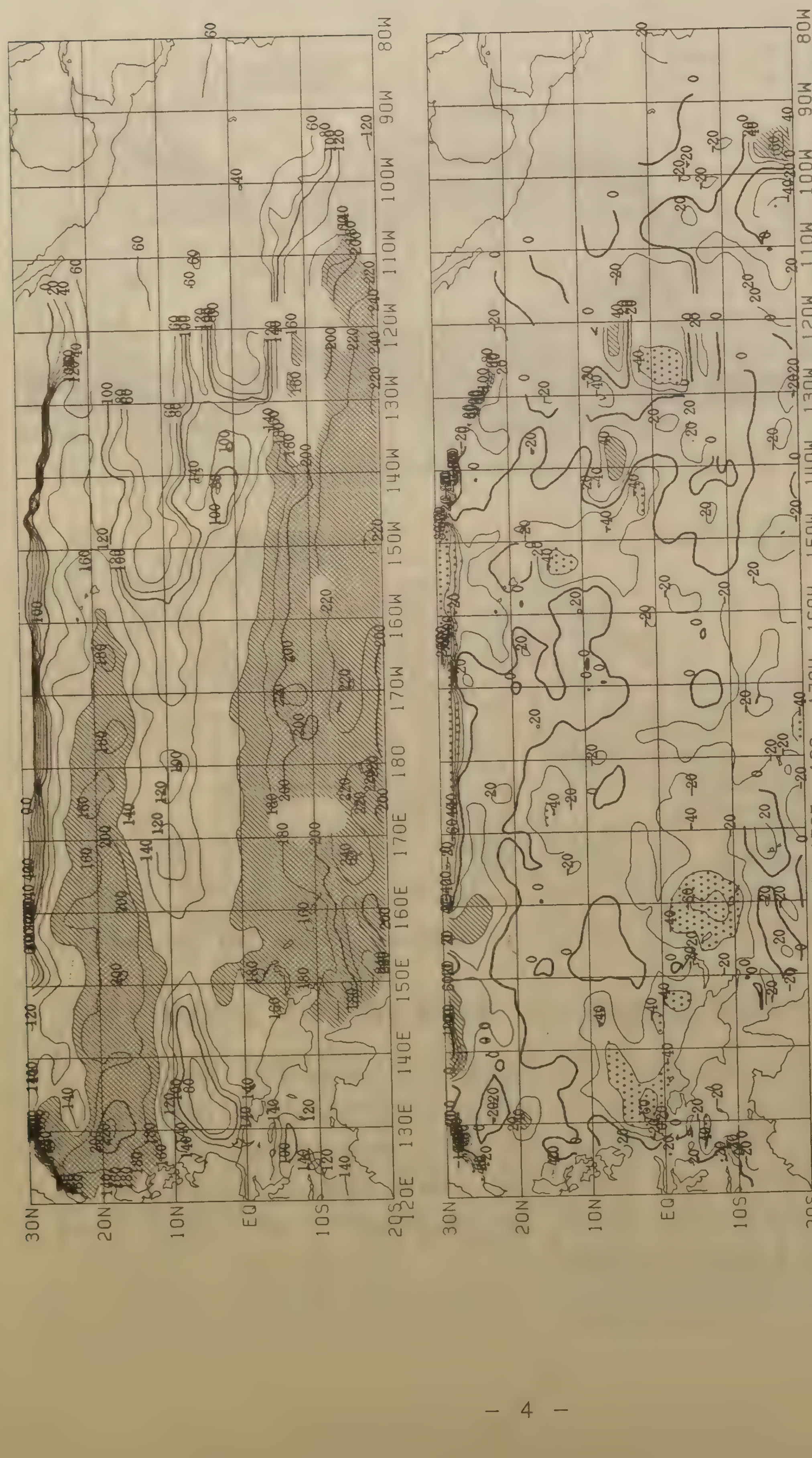
Table 1(b) El Niño monitoring indices (continued) .

Data source for these atmospheric conditions is the Long-range Forecast Division, JMA.



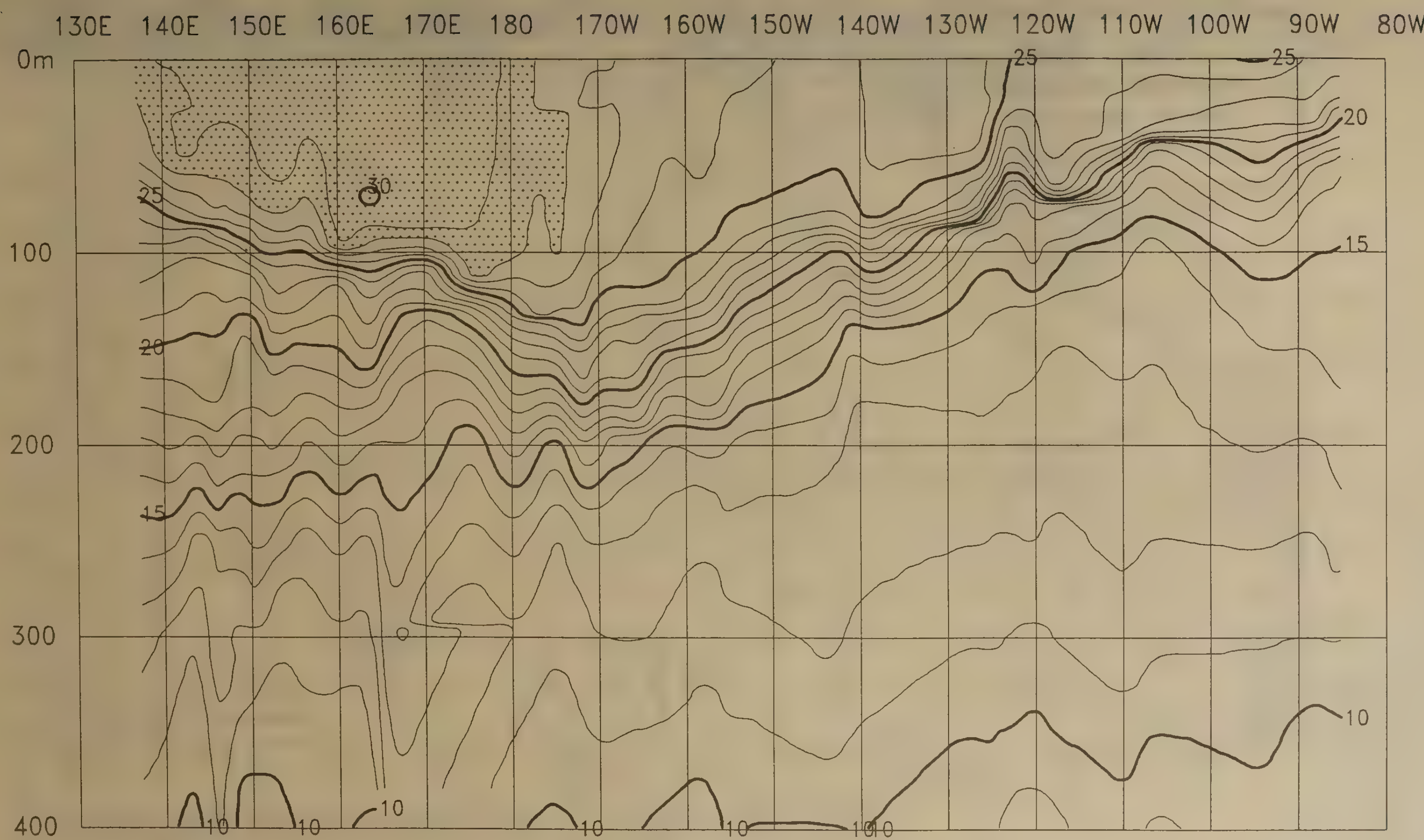
第１図　全球月平均海面水温図（上）及び偏差図（下）（1994年 1月）

Fig.1　Monthly mean sea surface temperature in the global ocean (top) and anomalies (bottom) for JAN 1994.　Anomalies are computed with respect to the JMA climatology (1961–90) (Climatic charts of sea surface temperatures of the western North Pacific and the global ocean, March 1991).　The Contour interval is 1° C and additional anomaly contours of ±0.5° C are shown as broken lines.　Negative anomalies are stippled.



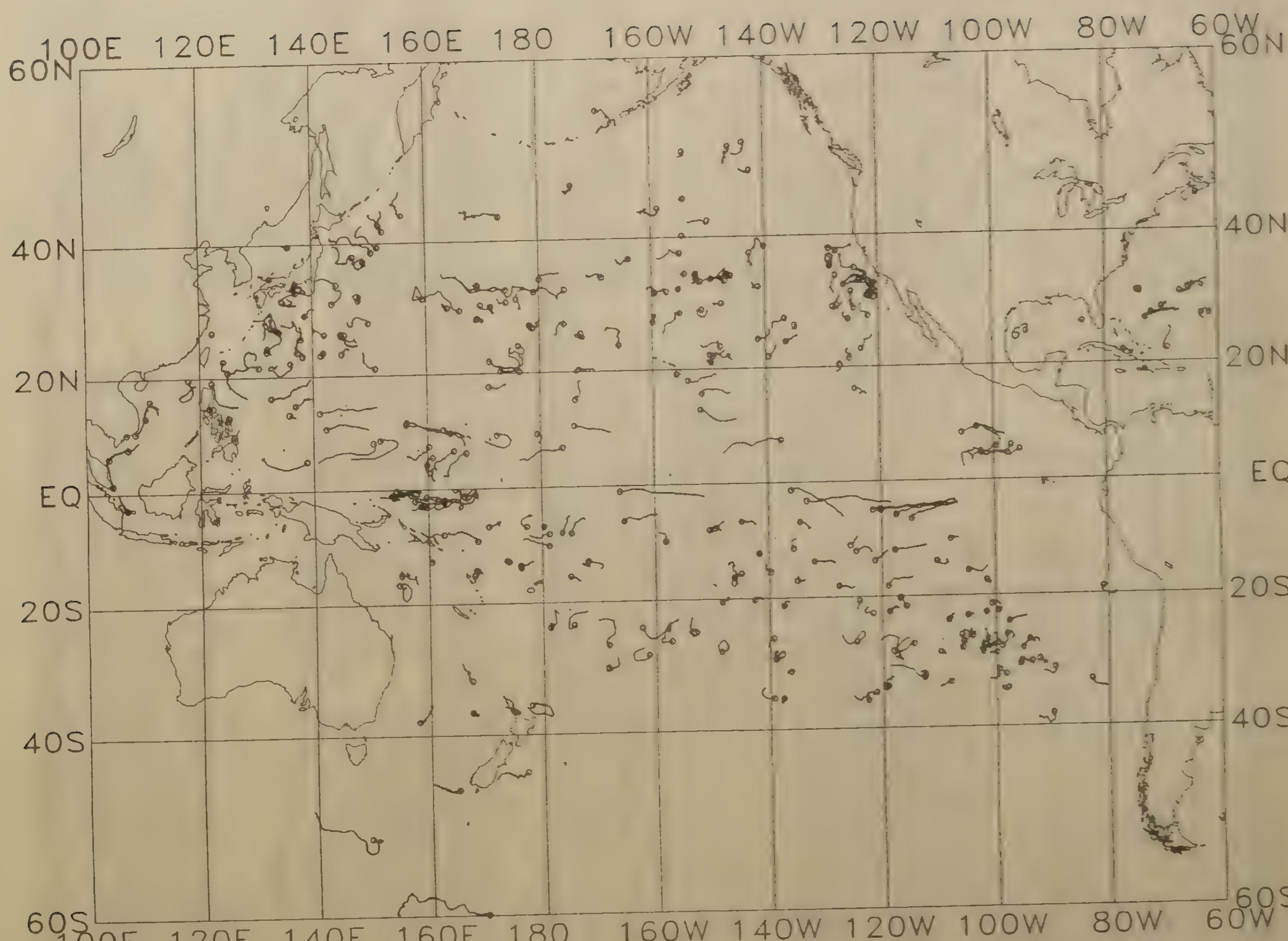
第2図　太平洋表層水温（20℃深度）図（上）及び偏差図（下）　（1994年 1月）

Fig.2 The depth of a 20° C isotherm in the Pacific Ocean (top) and anomalies (bottom) for JAN 1994. Anomalies are computed with respect to the climatology (Levitus, 1982, Climatological Atlas of the World Ocean, NOAA).
The contour interval is 20m with shading for values greater than 160m (top), and shading/stippling for values greater/smaller than +40m/−40m (bottom).



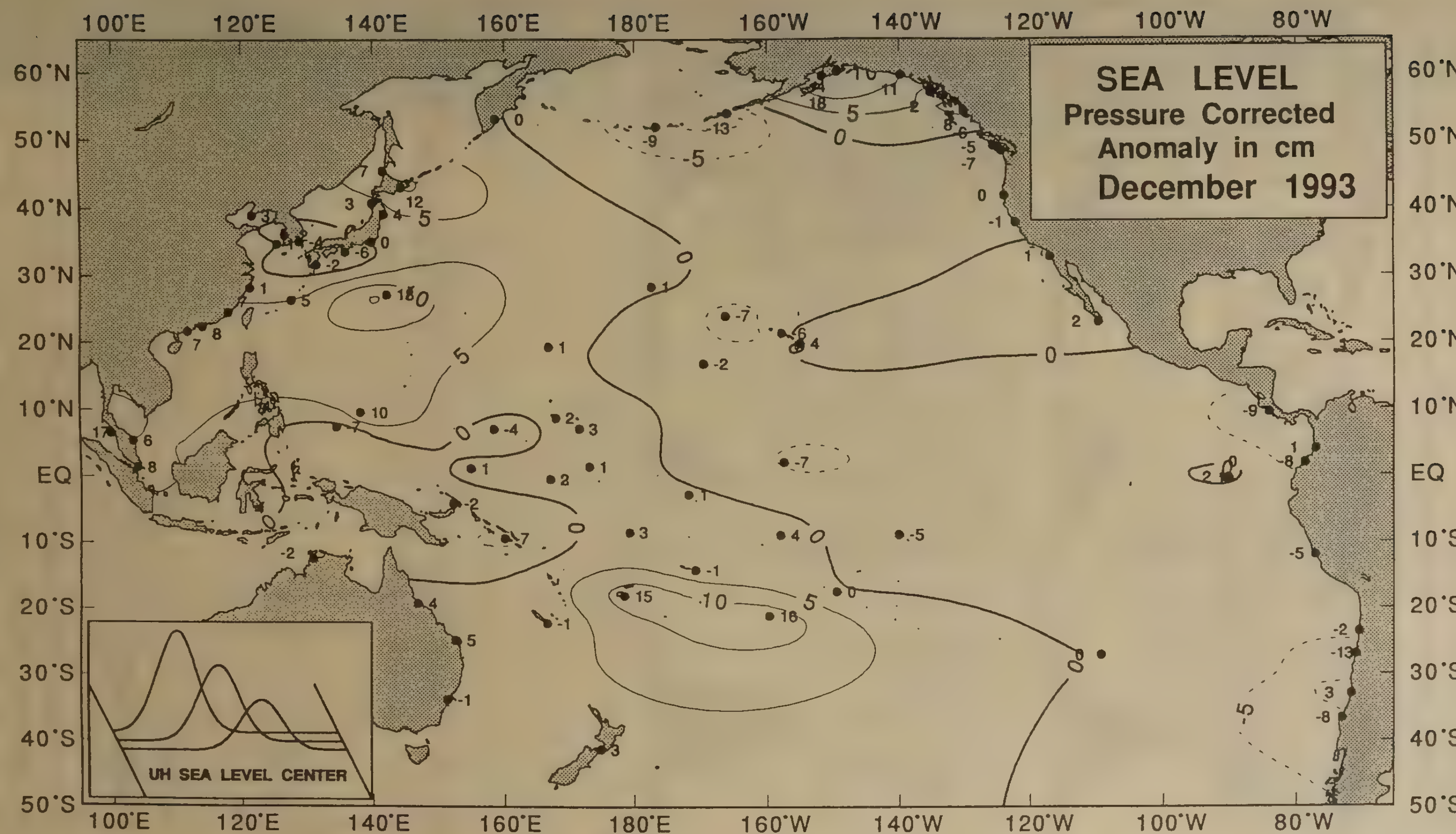
第３図　太平洋赤道に沿う表層水温断面図（1994年 1月）

Fig.3 Depth−longitude section of the Pacific Ocean temperature along the equator for JAN 1994. The contour interval is 1° C with spotted shading for values greater than 28° C.



第4図　太平洋ブイ流跡図(1994年 1月)

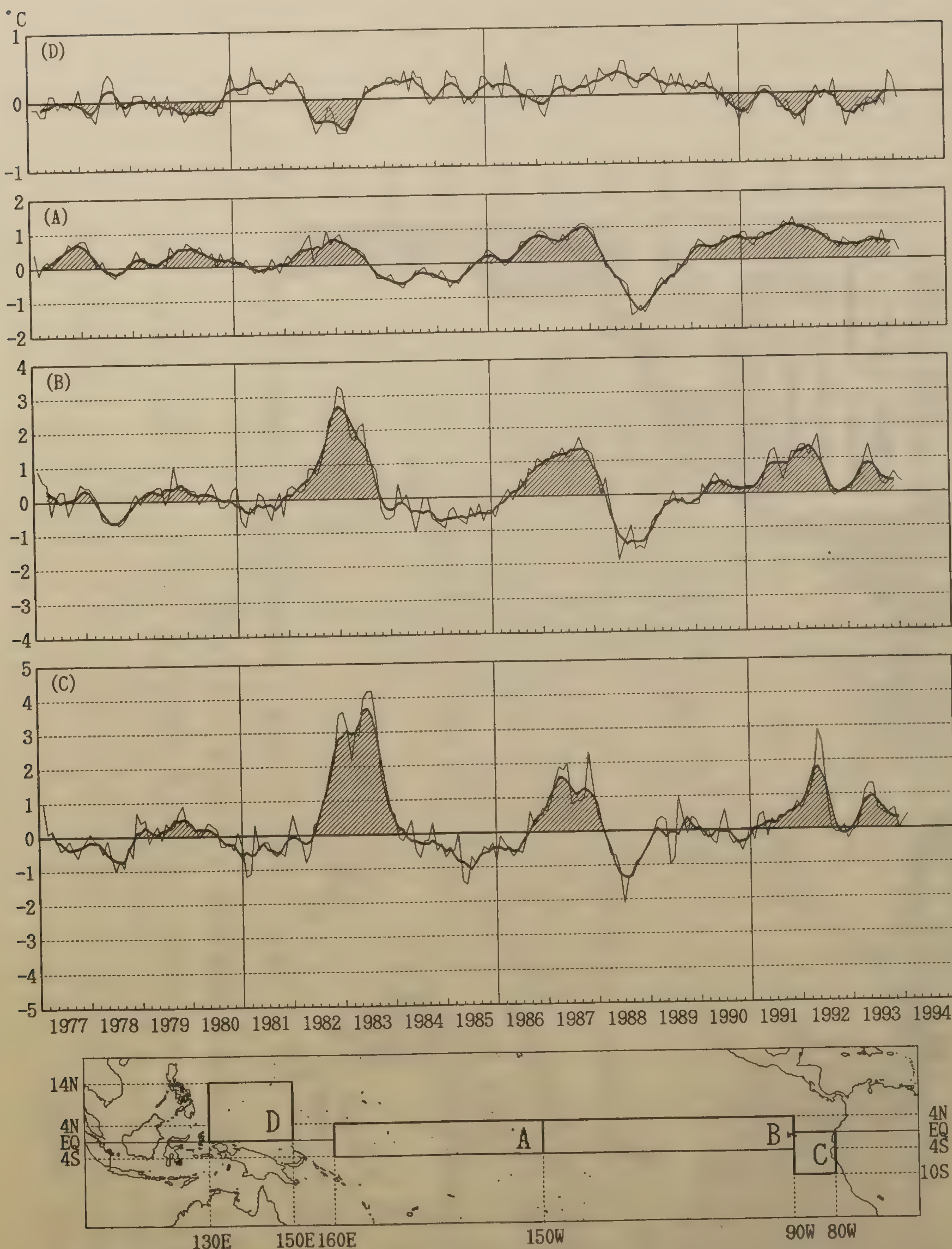
Fig.4 Movements of drifting buoys in the Pacific Ocean during JAN 1994. Each track is one buoy, with the small circle representing the buoy's last position for the month.



第5図　太平洋海面水位偏差図（ 1993年12月 ）

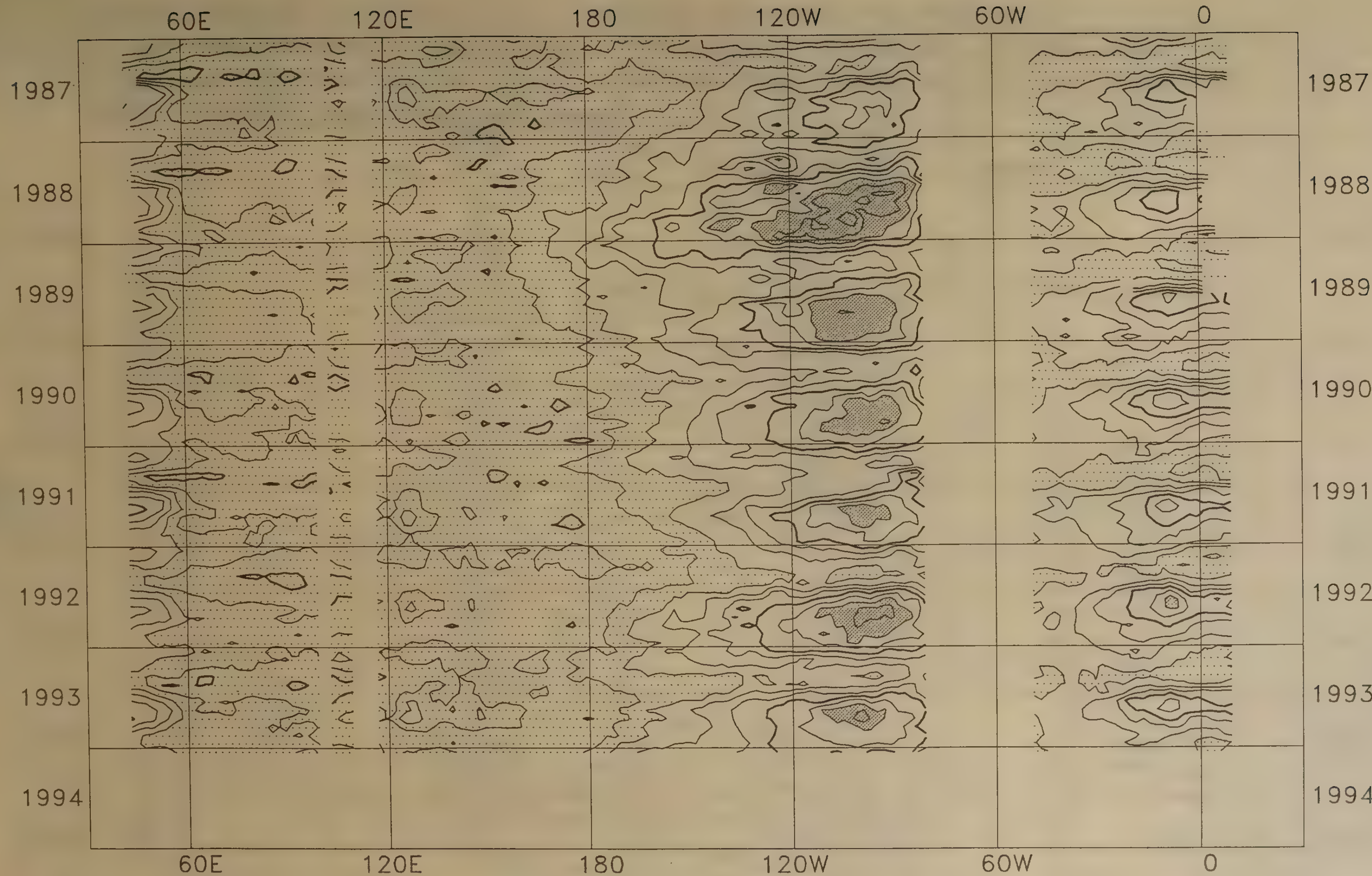
Fig.5　Sea level anomalies obtained from the 1975 to 1986 mean DEC sea level adjusted for atmospheric pressure (DEC 1993).
This figure is prepared by the SOC of ISLP−PAC, Dept. of Oceanography, Univ. of Hawaii.

Time Series of Equatorial Pacific SST Anomalies



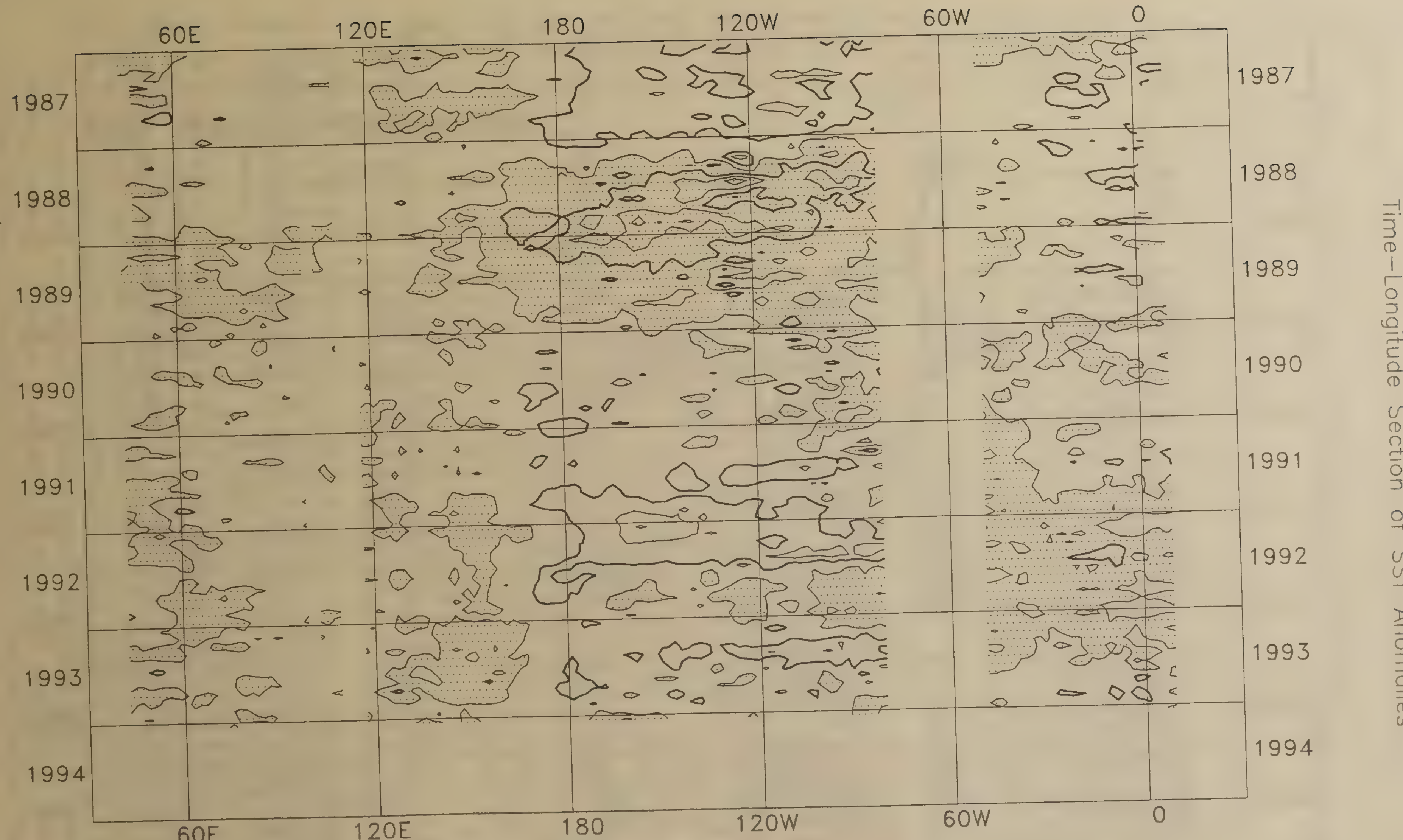
第６図　赤道太平洋海面水温偏差時系列図

Fig.6 Time series of monthly mean SST anomalies in the equotorial Pacific Ocean for the areas indicated at the bottom of the figure. Thin lines show the monthly values and thick lines their 5 month running mean. Positve anomalies (A,B,C) and negative anomalies (D) are shaded. Anomalies are computed with respect to the JMA climatology (1961−90).



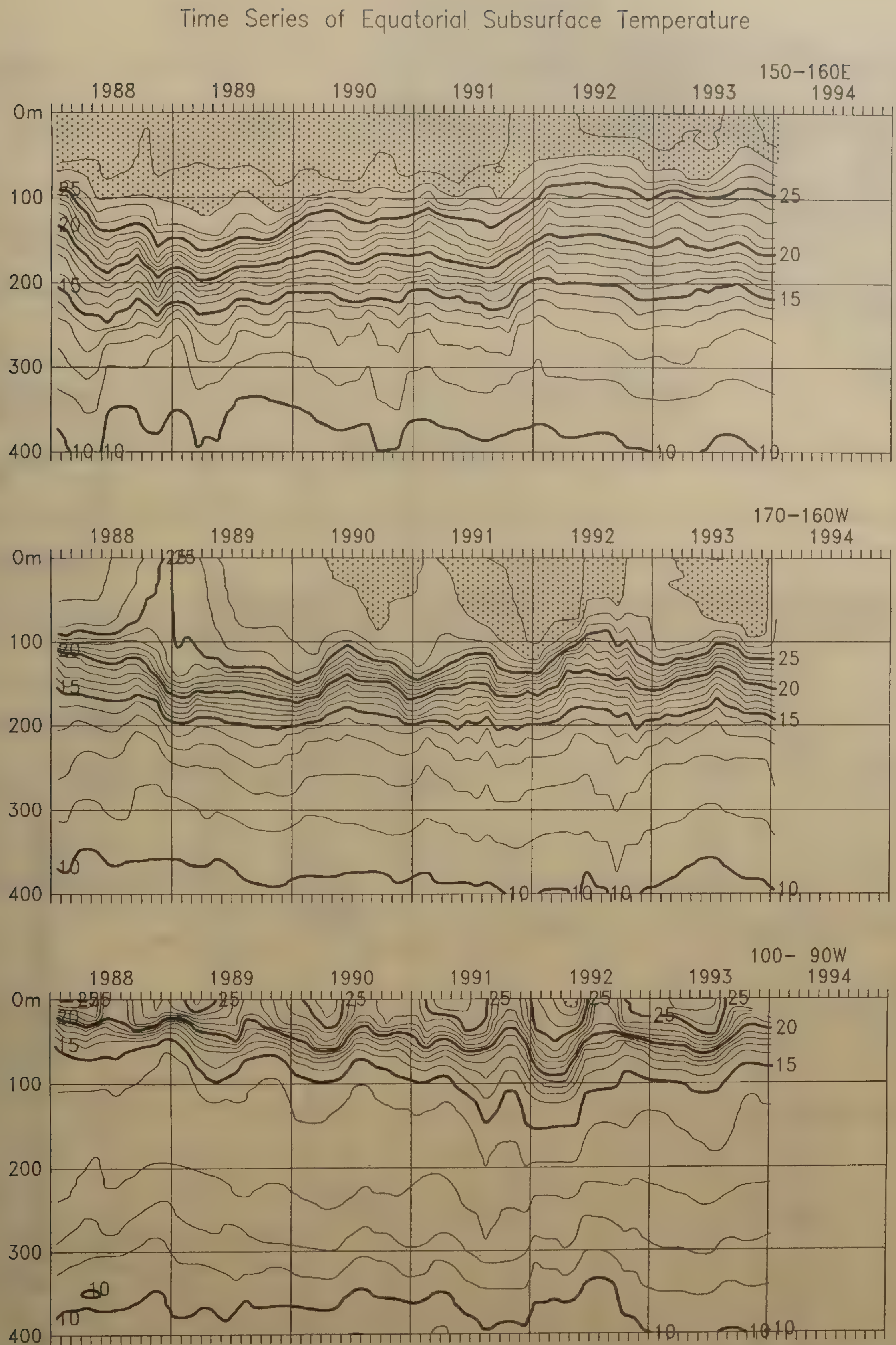
第7図　赤道に沿う海面水温時系列図

Fig.7 Time-longitude section of SSTs along the equator (2° N-2° S) in the global ocean. The contour interval is 1° C, with thick contour lines at 25 and 30° C. SST values greater than 28° C are spotted and values less than 23° C are shaded.



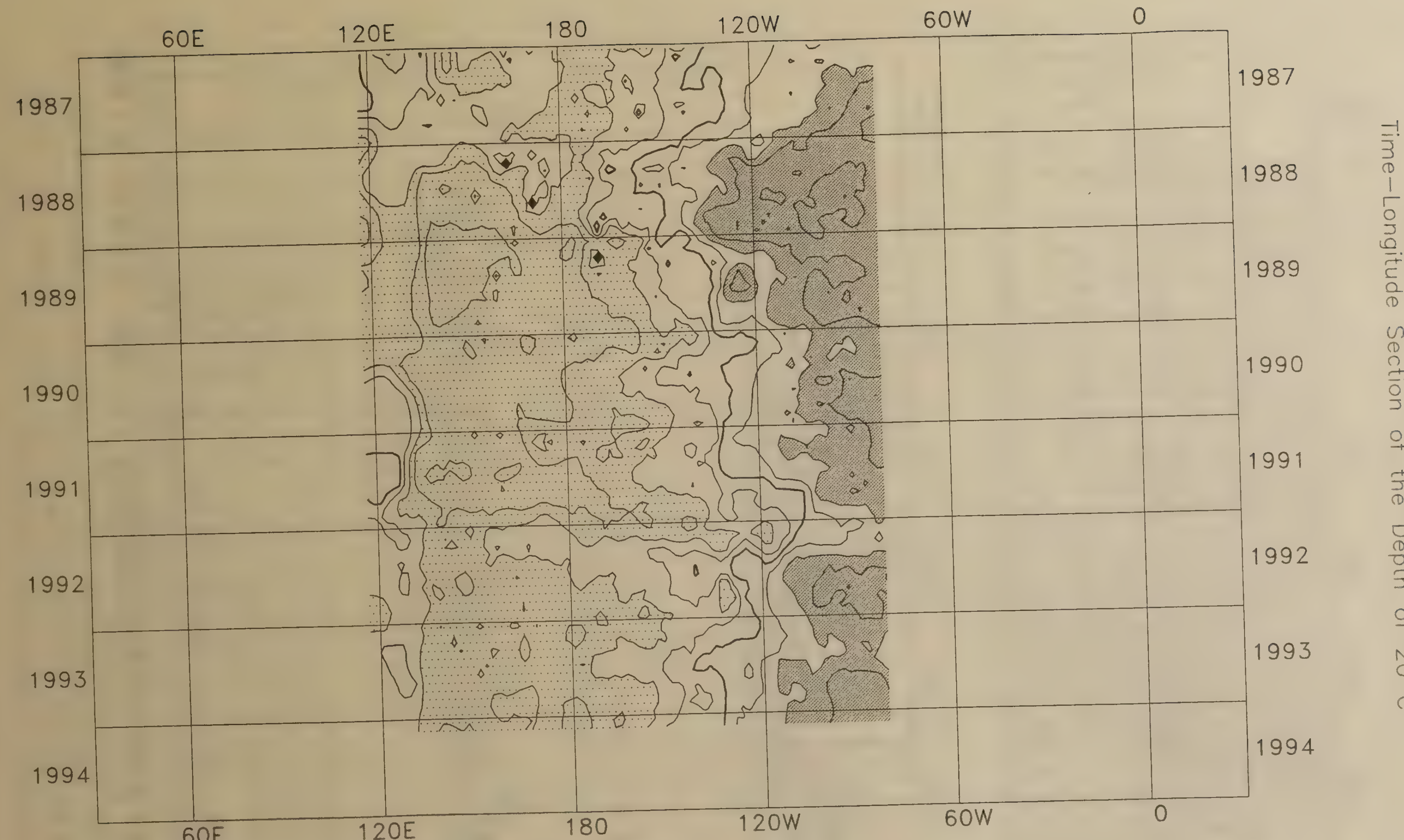
第8図　赤道に沿う海面水温偏差時系列図

Fig.8 Time-longitude section of SST anomalies along the equator (2° N-2° S) based on the JMA climatology (1961-1990). The contour interval is 1° C, with thick contour lines at +1° C and -1° C. Negative anomalies are spotted.



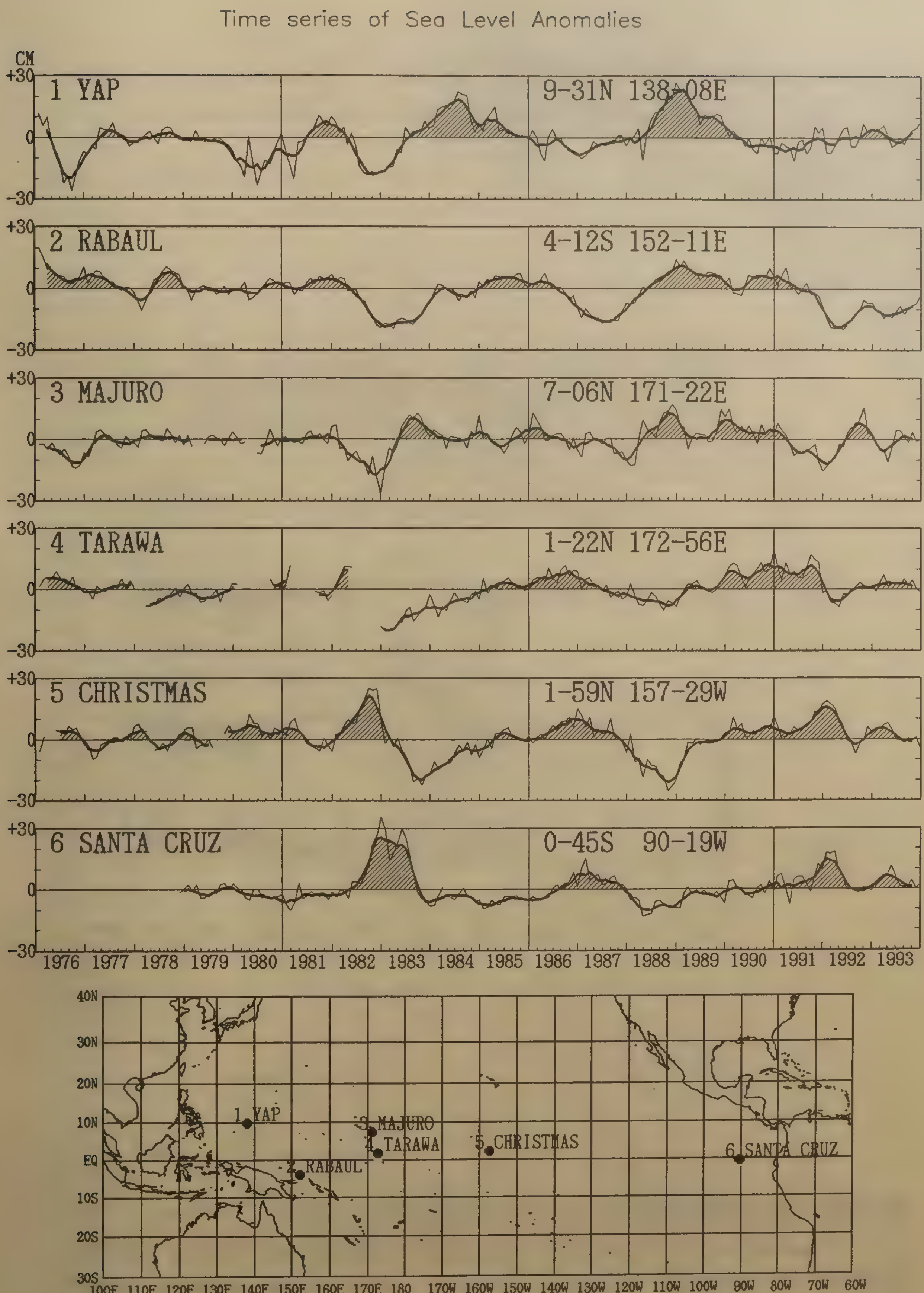
第９図　赤道太平洋表層水温時系列図（上：西部、中：中部、下：東部）

Fig.9 Time series of equatorial (2° N–2° S) subsurface temperature for the western Pacific (top, 150–160° E), the central Pacific (middle, 170–160° W) and the eastern Pacific (bottom, 100–90° W). The contour interval is 1° C with spotted shading for the values greater than 28° C.



第10図　太平洋の赤道に沿う20℃深度時系列図

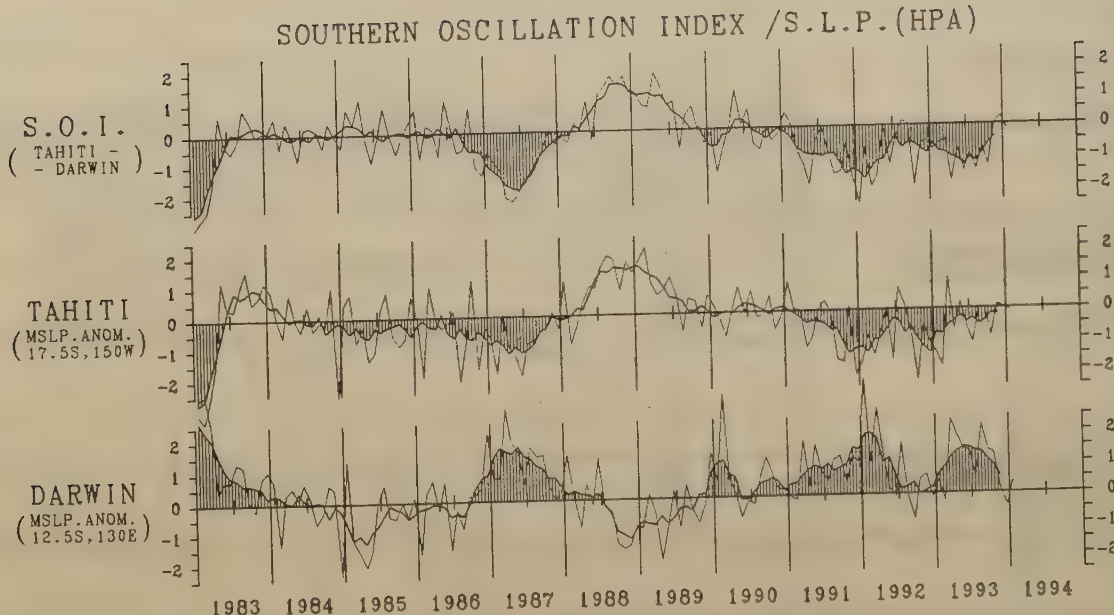
Fig.10 Time−longitude section of the depth of a 20° C isotherm along the equator in the Pacific Ocean. The contour interval is 20m with thick contour lines at 100m. Values shallower than 60m are shaded and those deeper than 140m are stippled.



第11図　太平洋月平均海面水位偏差時系列図

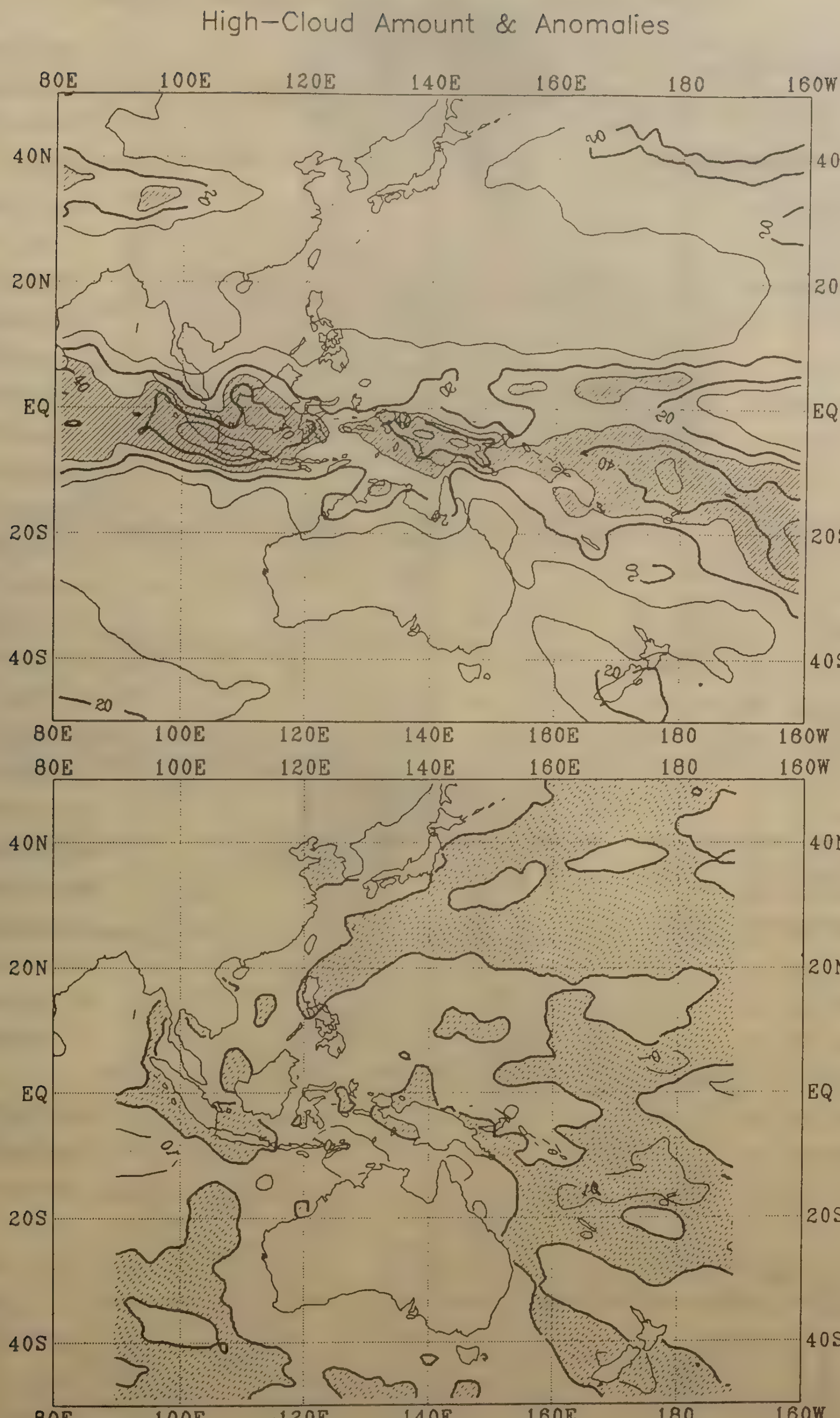
Fig.11 Time series of sea level anomalies based on 1976 to 1990 monthly mean sea level obtained from the stations indicated at the bottom of the figure. Thin lines show the monthly mean and thick lines show their 5 month running mean. Positive anomalies are shaded.

Time series of SOI & Sea Level Pressure Standardized Anomalies



第12図　南方振動指数及び海面気圧偏差時系列図

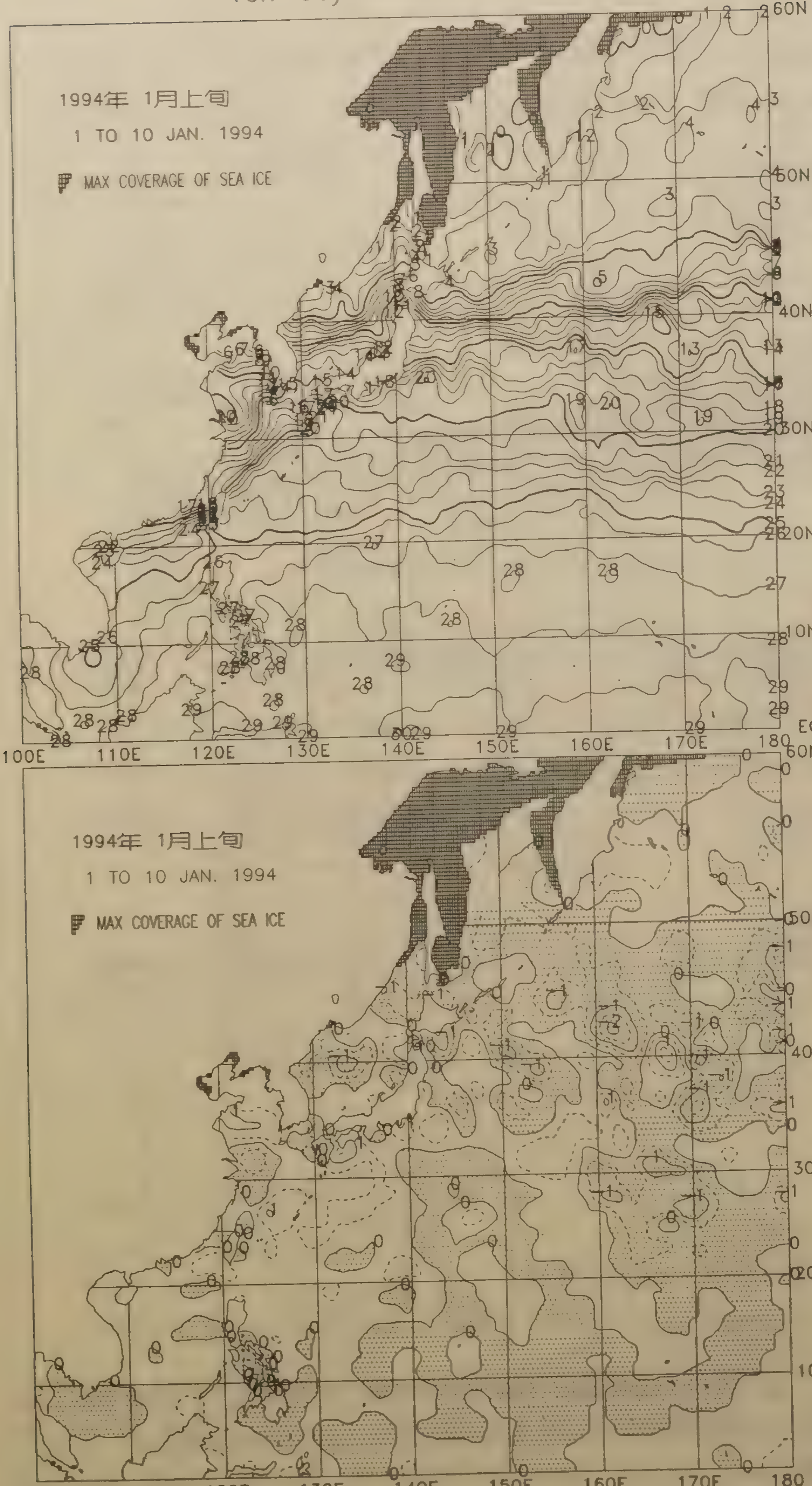
Fig.12 The Southern Oscillation Index (top) and monthly mean sea level pressure standardized anomalies at Tahiti (middle) and Darwin (bottom). Thin lines show the monthly mean and thick lines their 5 month running mean. Negative values (top, middle) and positive values (bottom) are shaded. Base periods for normals and standard deviations are 1961−1990. This figure is prepared by the Long−range Forecast Division, JMA.



第13図　月平均上層雲量分布図及び偏差図（1994年 1月）

Fig.13 Monthly mean of the high-cloud amount (%, top) and its anomalies (%, bottom) in the equatorial Pacific for JAN 1994. The contour interval is 10%. Areas above 30% are shaded (top) and positive anomalies are stippled (bottom). Anomalies represent a departure from the 1978–1990 base period monthly means. This figure is prepared by the Long-range Forecast Division, JMA.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	23.5	+2.8
那　覇(47936)	22.5	+1.0
名　瀬(47909)	-	-
足摺岬(47898)	18.1	+1.2
潮　岬(47778)	17.7	-
御前崎(47655)	13.4	+1.6
八丈島(47678)	19.1	+1.4
館　山(47672)	15.7	+0.8
小名浜(47598)	12.5	+1.1
宮　古(47585)	9.8	0.0
浦　河(47426)	2.4	−0.6
紋　別(47435)	0.8	-
稚　内(47401)	-	-
寿　都(47421)	7.8	-
江　差(47428)	6.3	-
飛　島(47587)	11.5	+0.6
輪　島(47600)	11.3	+1.2
西　郷(47740)	14.2	-
浜　田(47755)	13.1	-
厳　原(47800)	16.0	-
牛　深(47838)	17.3	-

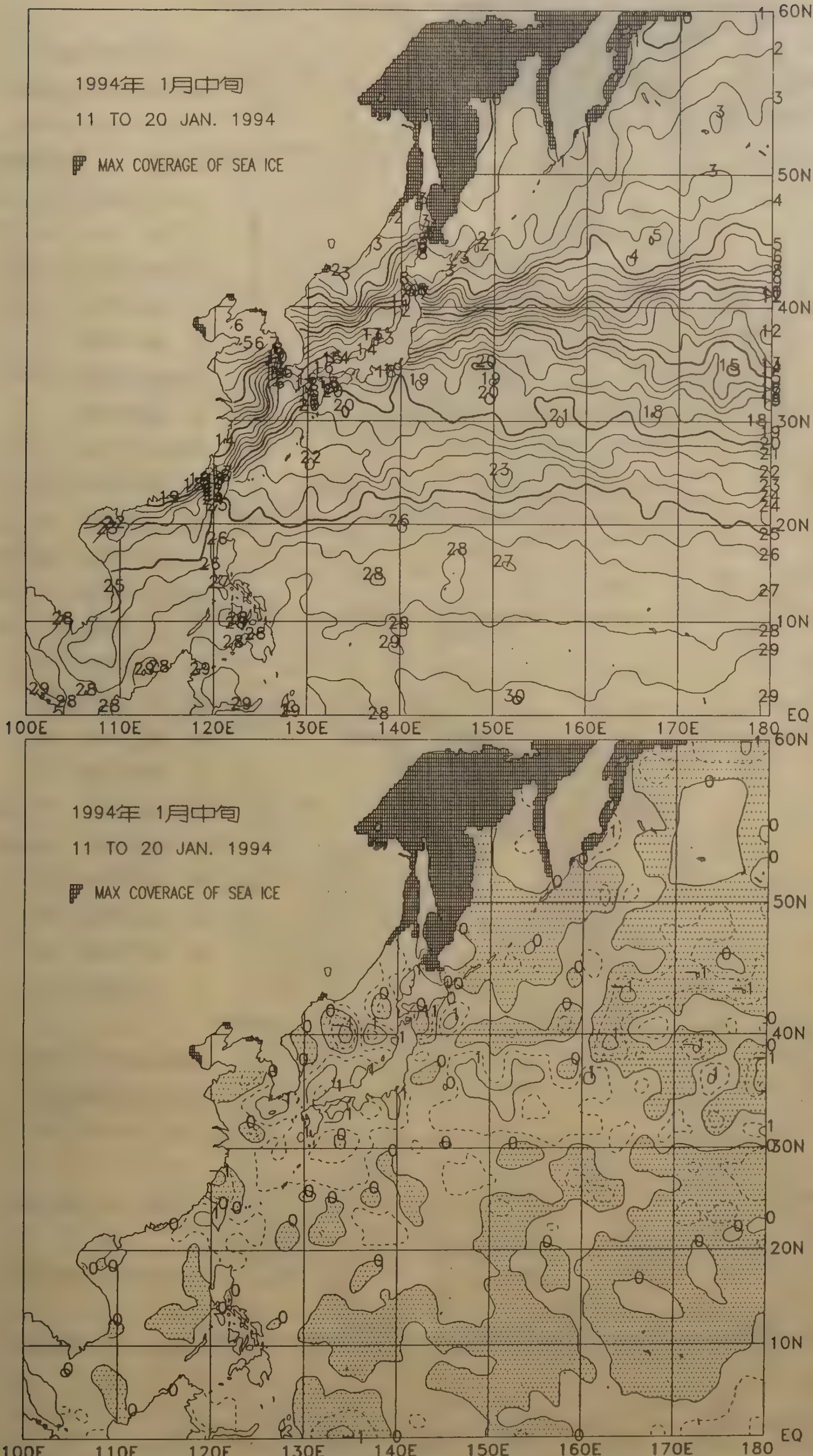
海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	11.8
四国沖	29.0N,135.0E	21.4
東シナ海	28.2N,126.3E	22.1

第14図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 1月上旬)

Fig.14 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in JAN 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.

Ten-day mean SST & Anomalies



旬平均沿岸水温(℃)
Coastal Water Temperature

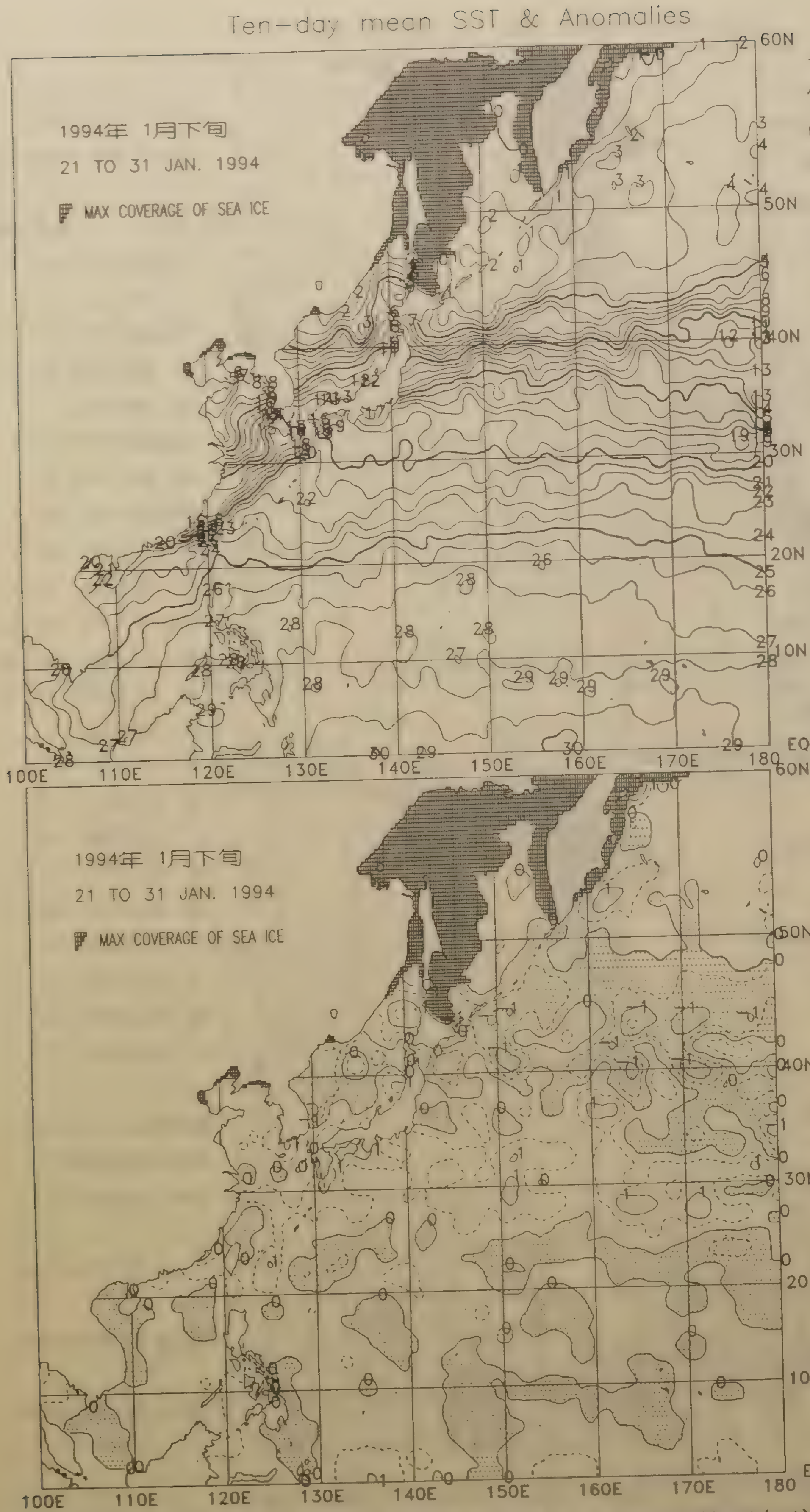
地 名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	23.1	+2.7
那 覇(47936)	22.4	+1.5
名 瀬(47909)	-	-
足摺岬(47898)	17.9	+1.9
潮 岬(47778)	19.1	-
御前崎(47655)	14.7	+3.7
八丈島(47678)	18.6	+1.4
館 山(47672)	16.3	+2.1
小名浜(47598)	12.0	+1.3
宮 古(47585)	9.3	+0.3
浦 河(47426)	1.5	−0.3
紋 別(47435)	−0.3	-
稚 内(47401)	0.7	-
寿 都(47421)	7.5	-
江 差(47428)	5.8	-
飛 島(47587)	9.1	−1.0
輪 島(47600)	10.6	+1.2
西 郷(47740)	13.8	-
浜 田(47755)	13.1	-
厳 原(47800)	15.9	-
牛 深(47838)	17.1	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	10.8
四国沖	29.0N,135.0E	21.1
東シナ海	28.2N,126.3E	21.2

第15図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 1月中旬)

Fig.15 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in JAN 1994. Anomalies are computed with respect to the JMA climatology (1961−90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



旬平均沿岸水温(℃)
Coastal Water Temperature

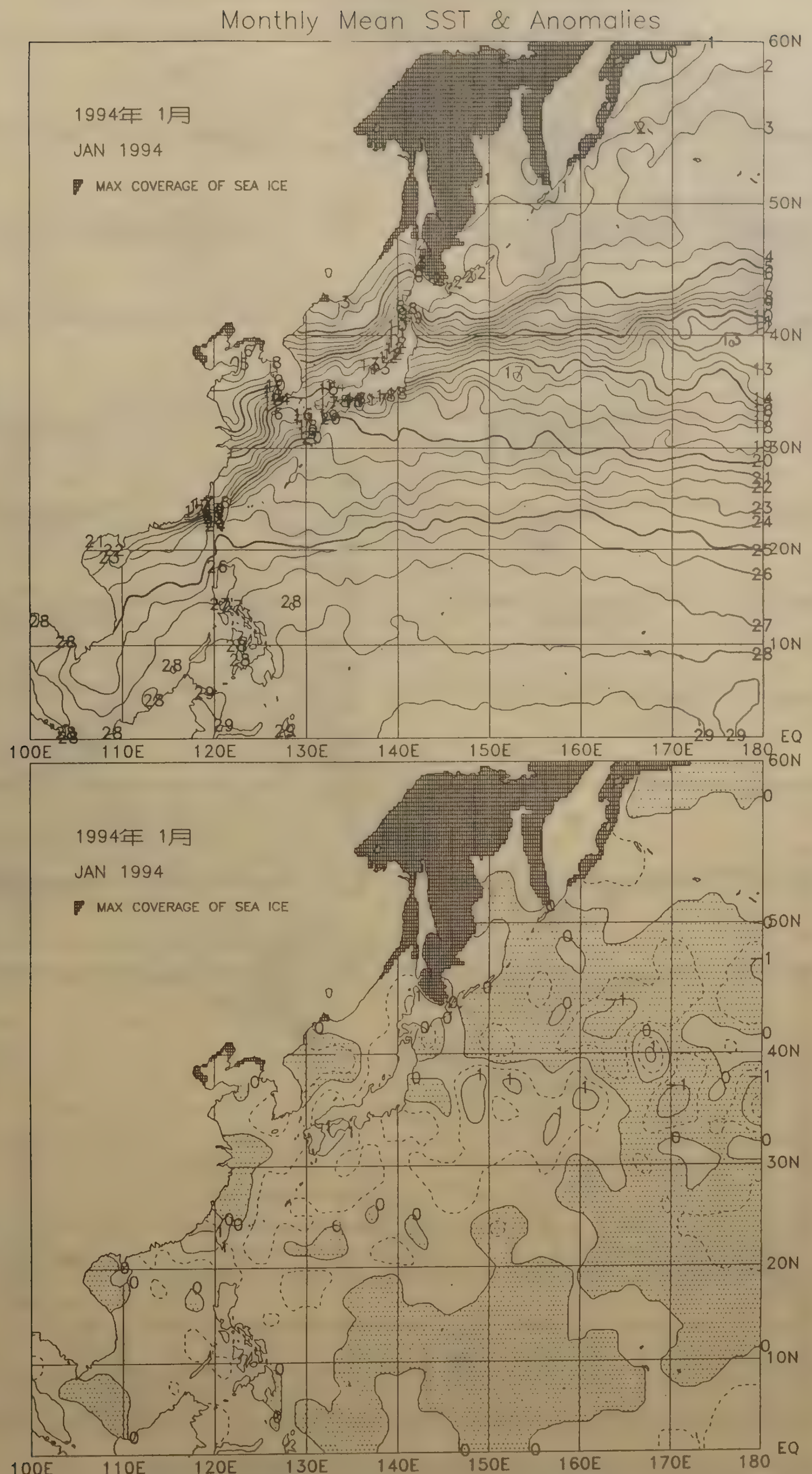
地名 (Index Number)	水温 Temp.	偏差 Anom.
石垣島(47918)	22.1	+1.6
那　覇(47936)	20.8	+0.7
名　瀬(47909)	-	-
足摺岬(47898)	16.5	+0.7
潮　岬(47778)	-	-
御前崎(47655)	12.9	+2.0
八丈島(47678)	16.9	-0.1
館　山(47672)	15.7	+1.7
小名浜(47598)	10.9	+0.6
宮　古(47585)	8.2	0.0
浦　河(47426)	0.1	-0.9
紋　別(47435)	-	-
稚　内(47401)	-0.1	-
寿　都(47421)	6.2	-
江　差(47428)	5.4	-
飛　島(47587)	7.9	-1.4
輪　島(47600)	9.4	+0.7
西　郷(47740)	13.5	-
浜　田(47755)	10.9	-
厳　原(47800)	15.0	-
牛　深(47838)	16.6	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	9.6
四国沖	29.0N,135.0E	21.3
東シナ海	28.2N,126.3E	21.0

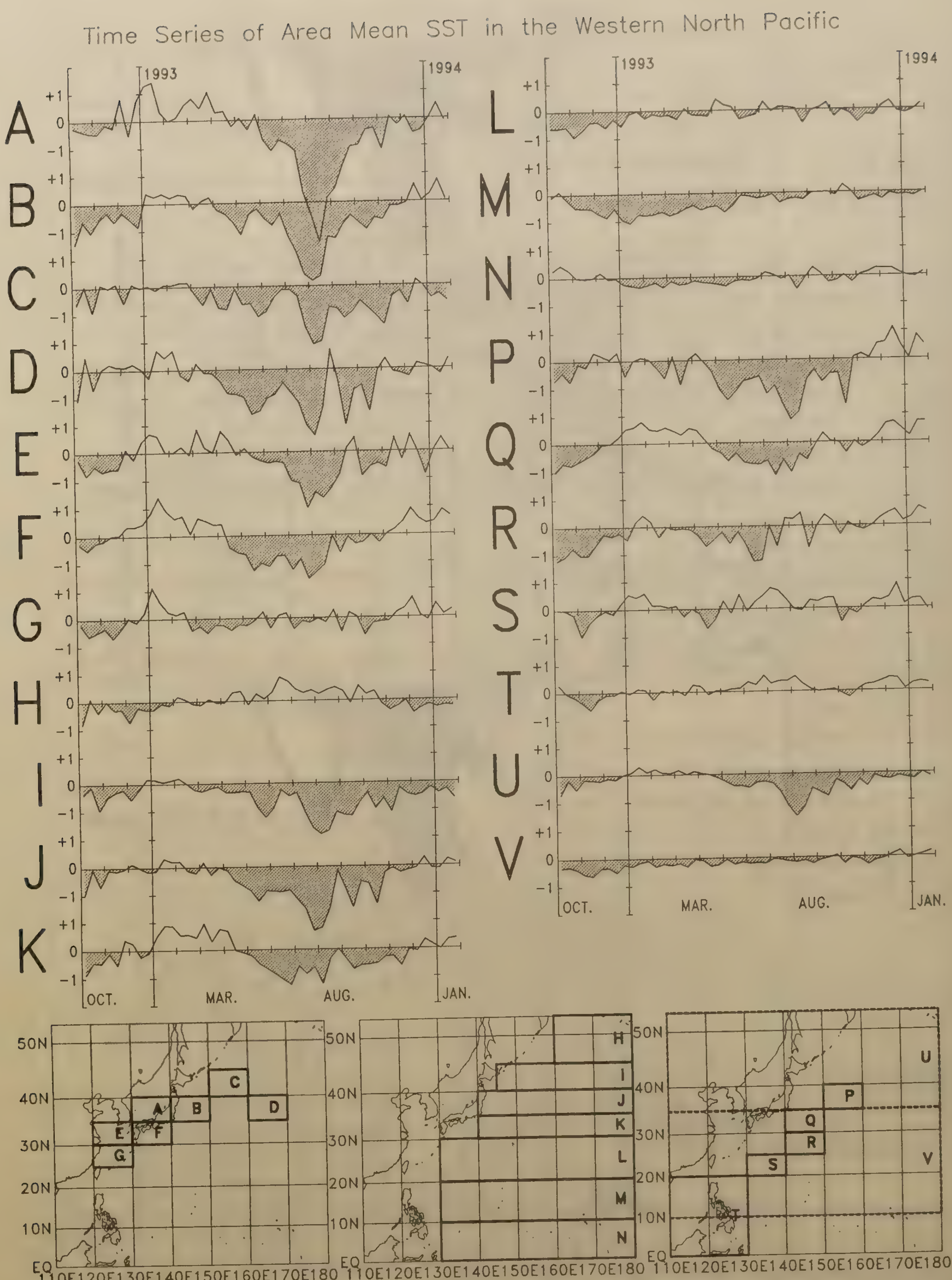
第16図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1994年 1月下旬)

Fig.16 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in JAN 1994. Anomalies are computed with respect to the JMA climatology (1961-90). The contour interval is 1°C and additional anomaly contours of 0.5°C are shown. Negative anomalies are stippled.



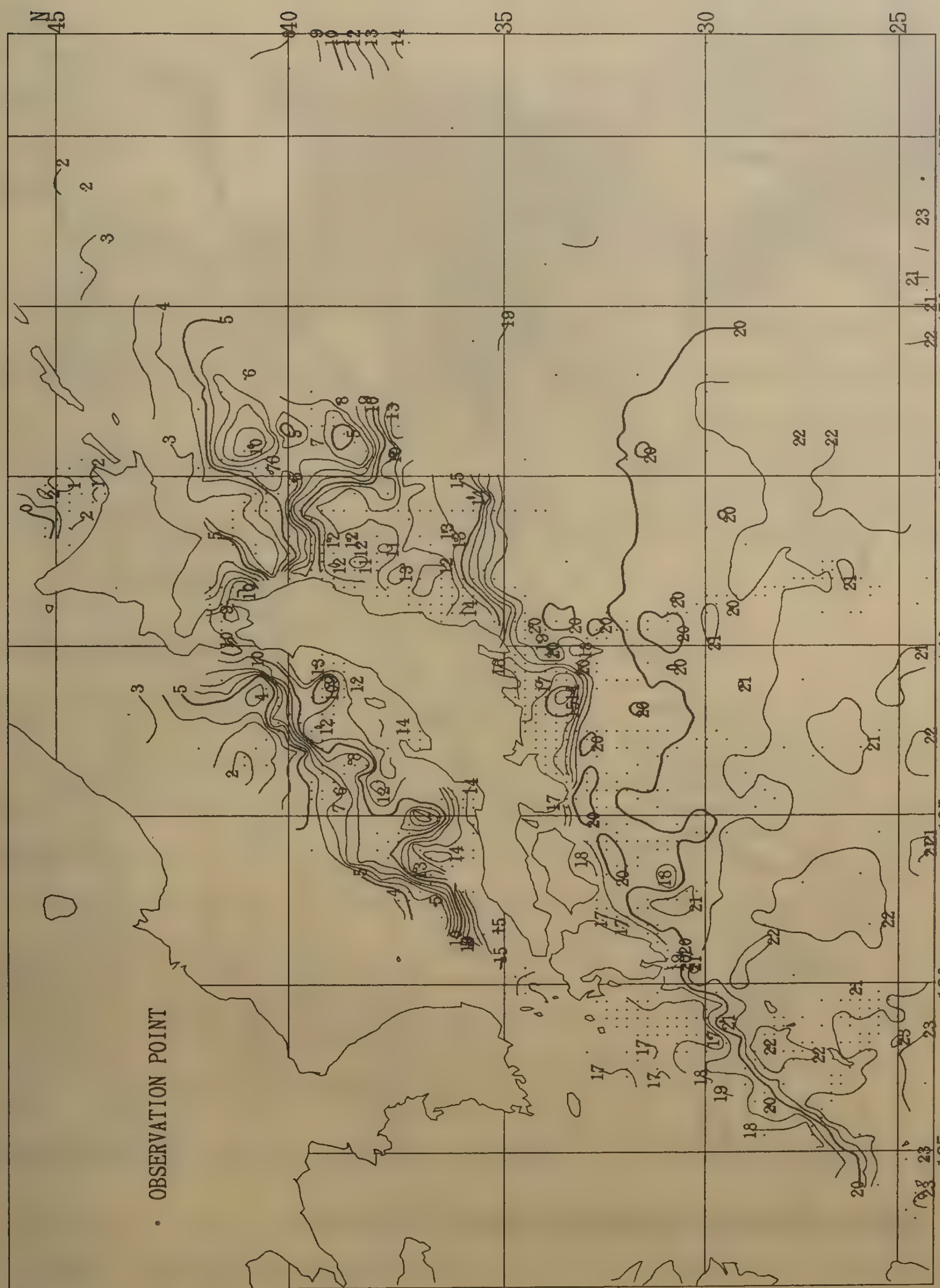
第17図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1994年 1月)

Fig.17 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for JAN 1994. Anomalies are computed with respect to the JMA climatology (1961–90). The contour interval is 1° C and additional anomaly contours of 0.5° C are shown. Negative anomalies are stippled.



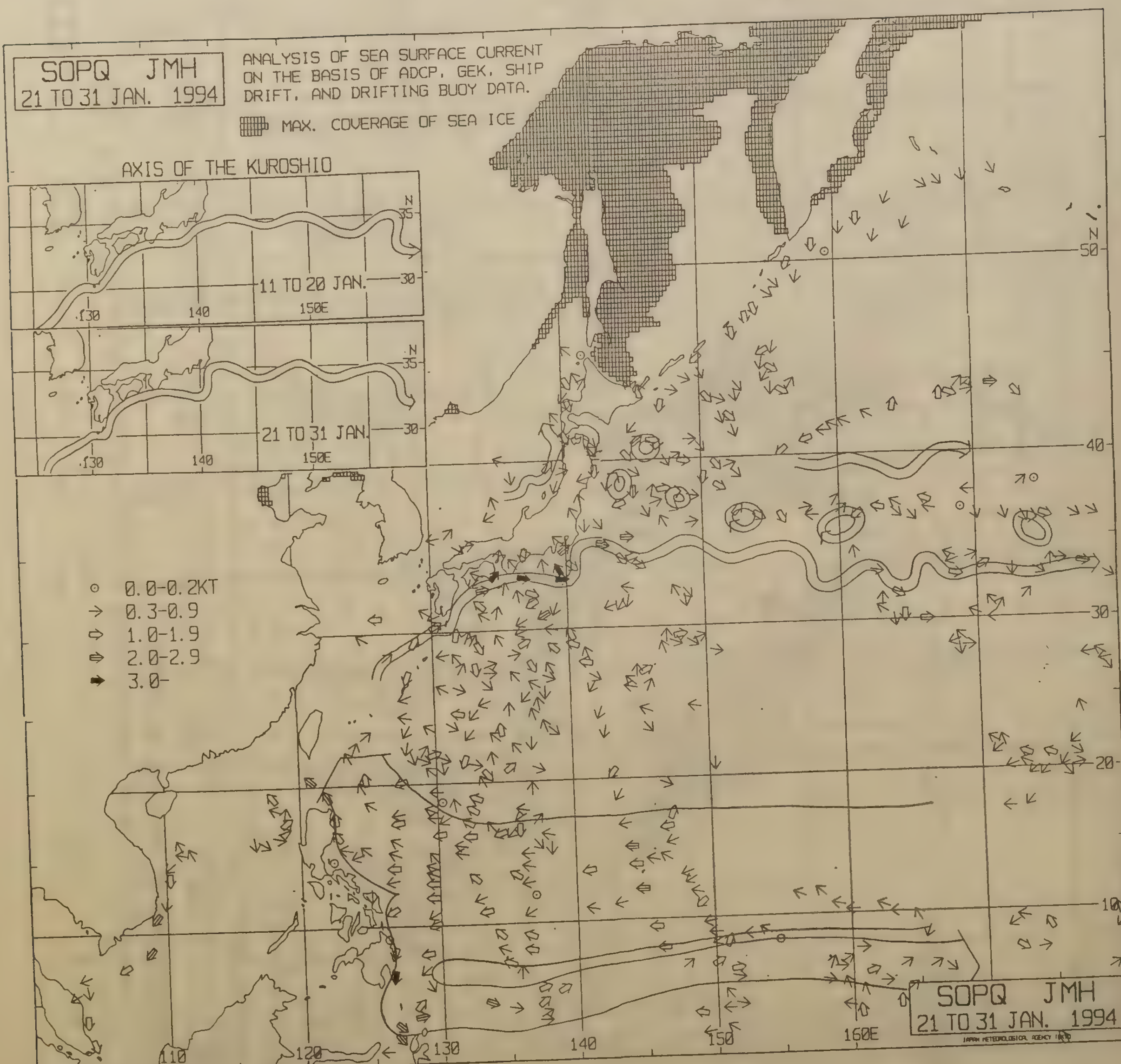
第18図　北西太平洋旬平均海面水温平年偏差時系列図

Fig.18 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas indicated at the bottom. Negative anomalies are shaded. Anomalies are computed with respect to the JMA climatology (1961-90).



第19図　日本近海表層水温（深さ100M）図（1994年 1月）

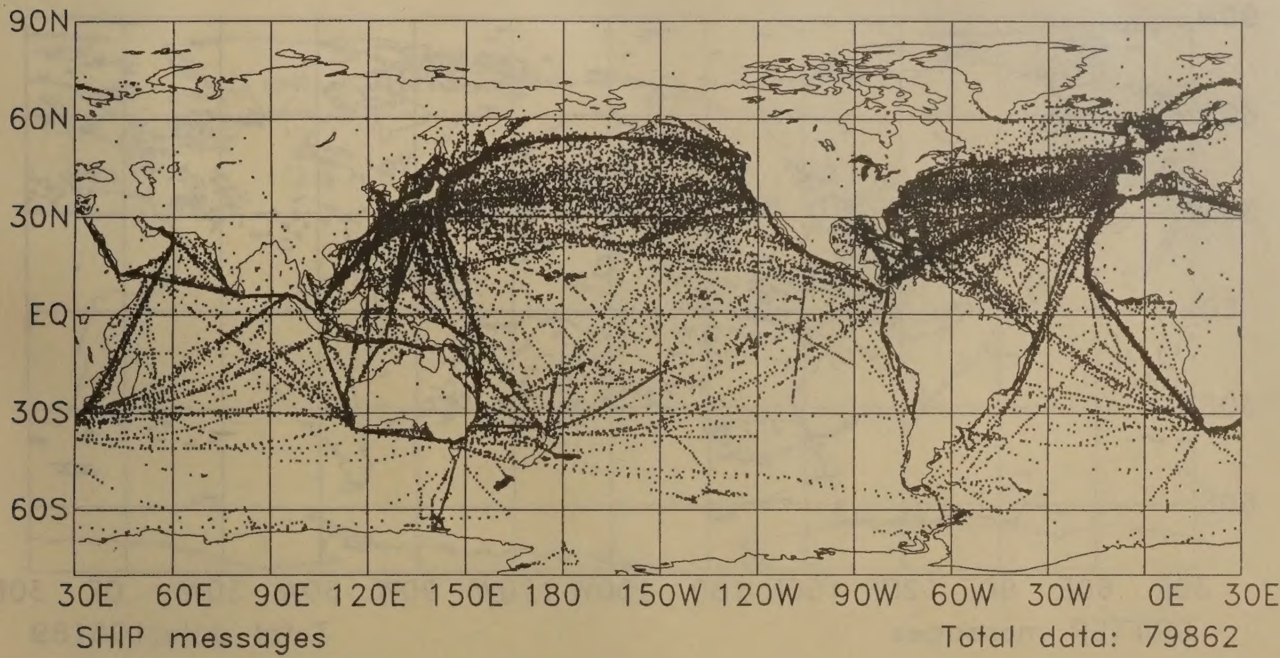
Fig.19　Subsurface (100m) temperatures in seas adjacent to Japan for JAN 1994.

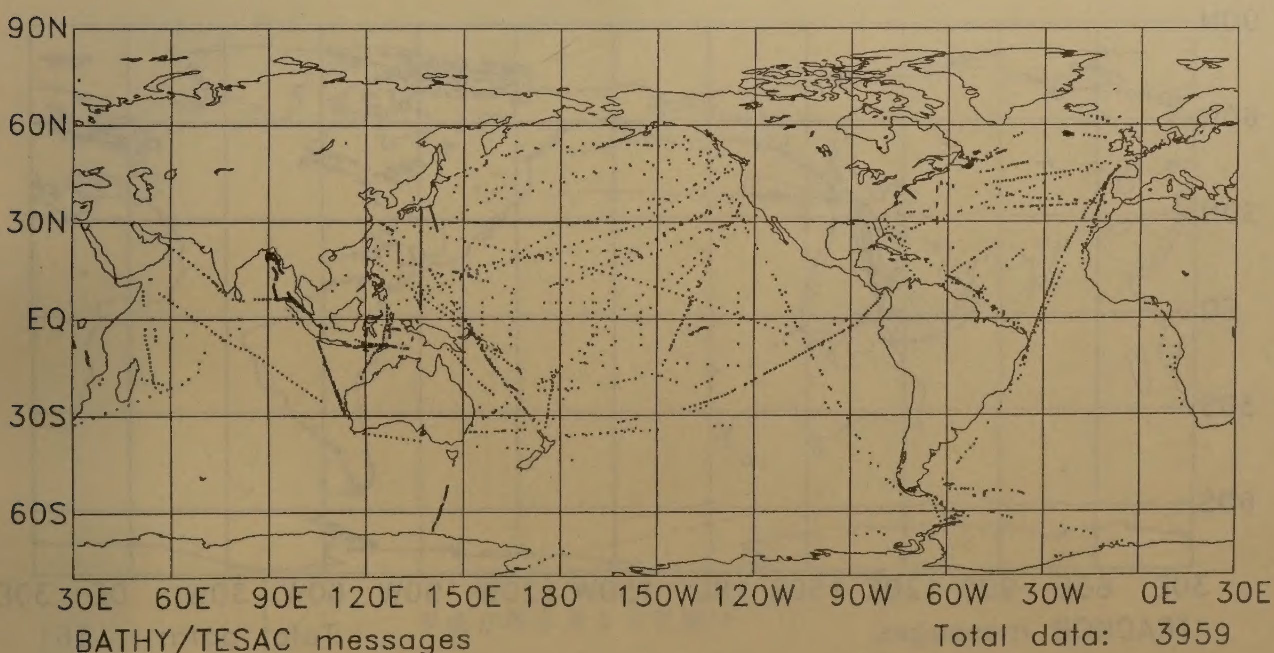


第20図　北西太平洋旬平均海流図（1994年 1月下旬）

Fig.20 Ten-day analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in JAN 1994. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

Geographical Distribution of Oceanographic Data

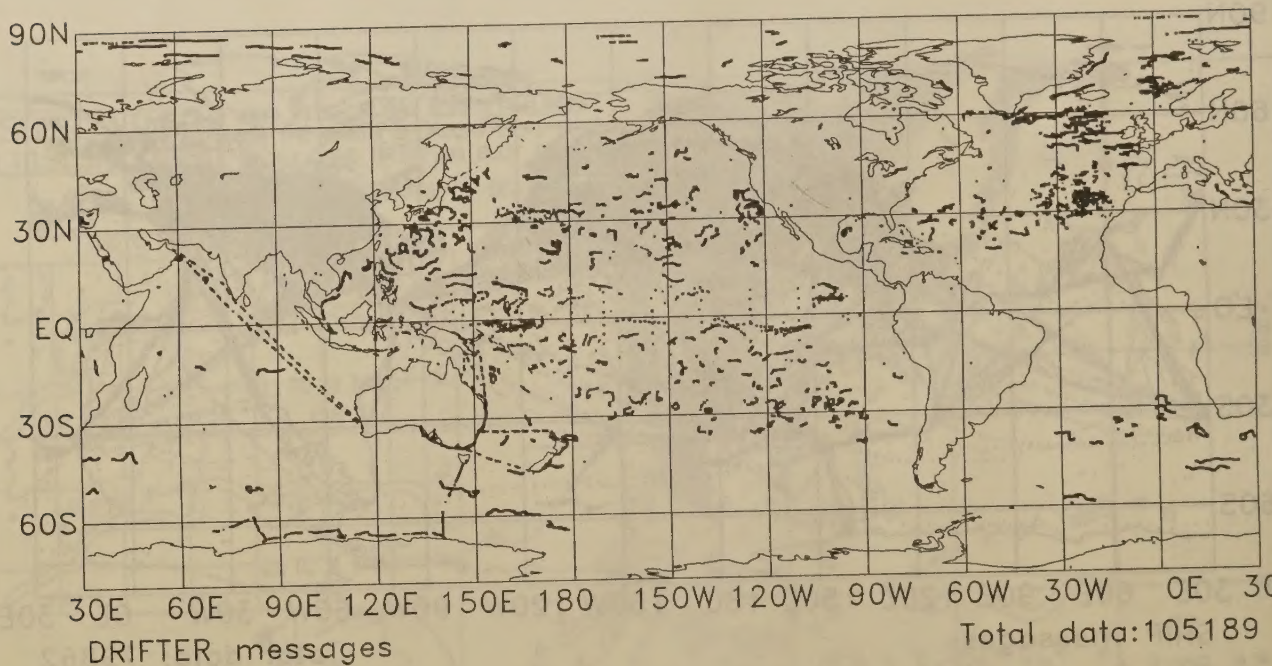


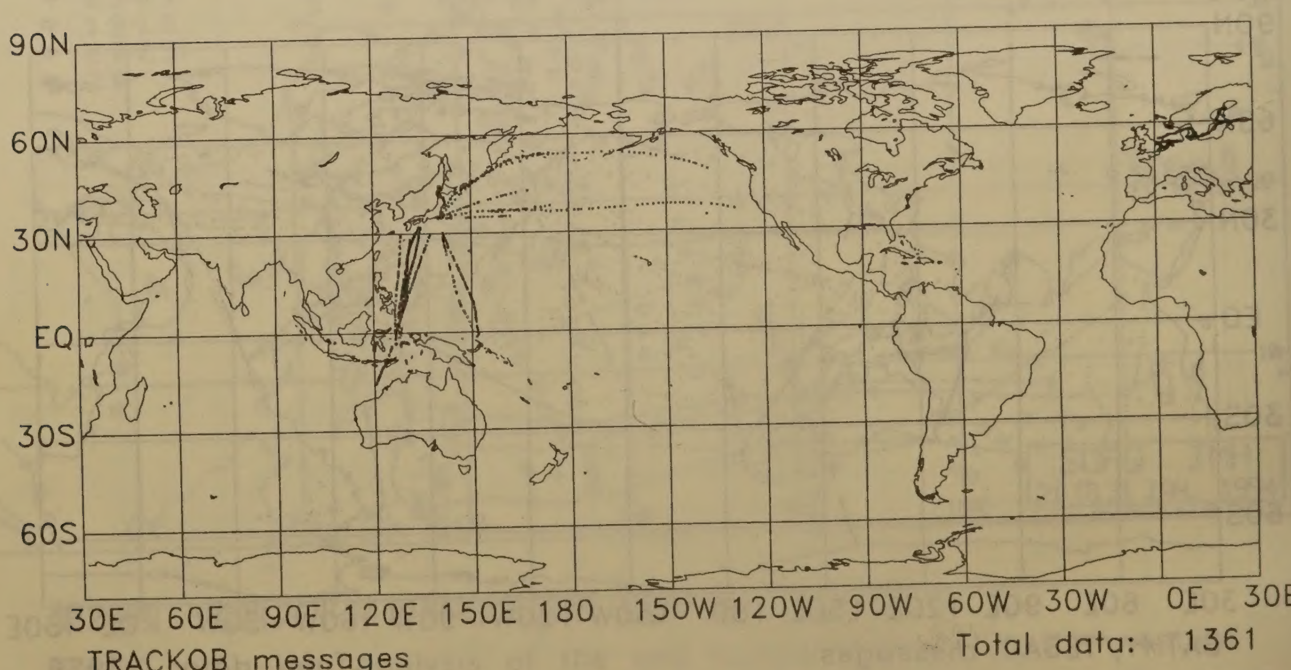


第21-1図 測点分布図(1994年 1月)

Fig.21-1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for JAN 1994.

Geographical Distribution of Oceanographic Data





第21-2図　測点分布図(1994年 1月)

Fig.21−2　Geographical distribution of DRIFTER messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for JAN 1994.

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